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The Zoological Paradox

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THE ZOOLOGICAL *PARADOX*

REIMAGINING ZOO ARCHITECTURE

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“In many ways, choice equates to freedom. The organism with the most choices can be said to have the greatest free-dom”

- Jon Coe, 1992

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. . .

. . .

These unsettling symptoms of "zoochosis" are exhibited by zoo animals under conditions of stress, depression, frustration, and boredom. Despite a century's worth of attempts to enhance the quality of zoos and to justify their existence, zoos continue to neglect the animals' physilogical and psychological welfare.

Zoos do not evolve with time.

"Naturalistic" exhibits and expansive enclosures are features that exist only to please the eyes of human visi-tors. These "enhance-ments" do little to address the persistent issue of the abnormal yet repetitive behaviors displayed by the animals.

While humans have the means to voluntarily escape stressful con-ditions, zoo animals are fixed in their single unchanging, static enclosure. Furthermore, zoos' banal and monotonous ways of ed-ucating visitors continue to misrepresent and generalize animals' natural behaviors.

A visitor remains a spectator.
An animal remains a spectacle.

Through on-site field investigation, studies of animal behaviors, and Jon Coe's zoo enrichment principles, this thesis proposes that zoo architec-ture should prioritize the needs of the animals by incorporating behavioral and environmental enrichments into its design. Enrichments refer to the pro- cess of providing the appropriate behav-ioral and environmental stimuli that foster the animals to exhibit their own natural behaviors.

Adapting Jon Coe's strategies and Heini Hediger's concept of territory as precedents, "A Zoological Paradox" proposes the re-imagining of the zoo typology by integrating existing enrich-ment methodologies, as well as allowing human visitors to interact and engage in the process of enriching the animals' well-being. Through strategies of introducing choices and novelty to the "Animal Folly" enclosure, and allowing a visitor's participation, the reimagined zoo offers the animals a sense of freedom within captivity; a temporary relief from stress within their confines. A continuous network of "corridors" replaces conventional enclosures; reflecting each animal's territorial path-ways and further providing a sense of choice and freedom.

Shifting the visitor's role from a mere spectator to an active participant not only enhances his or her experience at the zoo, but also re-shapes the percep-tion that these enrichments are what really matter. Rather than a "naturalistic facade," enrichments become the most crucial component for animals born and raised in captivity.

A visitor's notion of the zoo may be defamiliarized.

An animal's well-being is addressed and enhanced.

“Everyone has **stress**...

The thing is that while [us] humans can have stress, it usually doesn’t mean that [our] welfare is in jeopardy,

partly because humans can remove themselves from stressful situations and have things to look forward to.”

For the most part, animals live in the **present**. If their present is a small caged enclosure, then that is a stressful existence from which they **cannot escape**."

(source: care2.com)

THE STORY OF GUS

a brief intermission | a case study

nytimes.com

Born in Toledo Zoo, Ohio back in 1988, Gus was a beloved, iconic, mischievous polar bear of Central Park Zoo, New York City. He was visited by over 20 million people during his life time and enjoyed a much longer lifespan than his average captive friends of more than 27 years. This 700-pound furry creature did not become famous for being the largest attraction in the zoo, nor for any particular talents he might possess; but rather for a very curious behavior.

The mid-1990s was when visitors first saw Gus compulsively swimming figure eights in his pool for no obvious reasons. He can be seen doing this for sometimes up to 12 hours a day.

He was not trained to do this as a performance.

He was not expressing his natural behavior as seen in the wild.

Gus's neuroticism earned him the nickname "the bipolar bear," a dose of Prozac, and $25,000 worth of behavioral therapy.

Like many other animals, Gus copes with his unstimulating or small environments through this stereotypic behavior.

What happened to Gus, happened to many other zoo animals living under the same condition.

This condition is better known as

“ZOOCHOSIS”

[noun]

AKA “Animal psychopathology”, “Behavioral disorder”, “Stereotypical behavior”

A condition of obsessive, repetitive behaviors that serves only as **coping mechanism** to the stress zoo animals experience while living in unsuitable, artificial environments with little no to stimulation or enrichment.

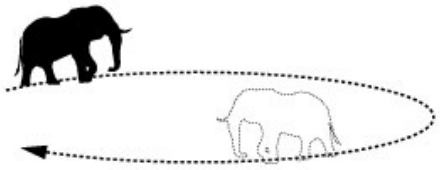
A ZOOLOGICAL DILEMMA

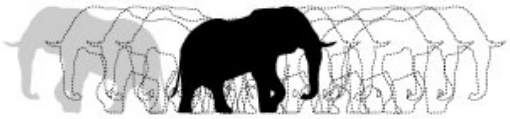
100%

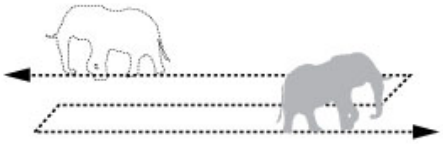
Gus was forced to live in an enclosure that is 0.00009 percent of the size his range would have been in his natural habitat of the Artic.

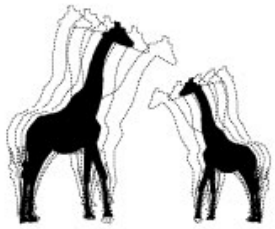
ZOOCHOSIS

psychosis within captivity









Why should we care?

In captivity, wild animals face a number of challenges in which evolution has not prepared them for. The artificial environment of a zoo can sometimes lead to an animal feeling bored, frustrated, and stressed. The result of this is a development of a stereotypic behaviour of the animal that is both compulsive and unnatural.

The modern theory of the root cause of these stereotypic behaviours explains that zoochosis results from brain disfunction that is the result of stress. But the correlation between the stress at the time when the behaviour is being performed and the actual behaviour itself is inconsequential. Although stress may have caused the development of this behaviour, that behaviour is not perpetuating.

The question is, at what point does chronic stress become a welfare problem? Stress is ordinary part of life. There is a difference between being stressed and having a poor quality of life or welfare.

What are other potential causes of Zoochosis?

There are number of factors that can trigger and result in stereotypical behaviors of Zoochosis. First and foremost, most animals are forced to live in artificial environments with little stimulation, enrichment or opportunity to hide from the public gaze. Most often they are being held in captive environment that does not cater to their species-specific needs. Zookeeper all too often generalize the animals' behavior and not put into account individual needs. All animals are different; they have different background, temperaments, and personality.

Another cause is called 'invasive intervention' which refers to the restriction of movement, training using negative reinforcement techniques, being trained to preform unnatural behaviours. Animals are often relocated as too many of the same species of the same zoo. This caused a disruption of family or pack units for the sake of breeding. Last but not least, drugs and medical fertility control are also a factor that is often overlooked as the cause of Zoochosis.

SYMPTOMS

Bar biting

Pacing

Circling

Rocking

Head-bobbing

Tongue-playing

Head-Weaving

Swaying

Neck twisting

Head weaving

Tongue playing

Vomiting

Coprophagia

Overgrooming

Self mutilation

Regurgitation

Reingestation

Trichotillomania

Coprophilla

Caprophagia

Apathy

Prolonged Infantility

Abnormal Aggression

....

The list goes on

Access the link below to view videos of some of the symptoms of Zoochosis:

< http://www.bornfree.org.uk/campaigns/zoo-check/captive-wildlife-issues/abnormal-behaviours/ >

Neck-twisting








Pacing








Swaying








Self-mutilation








Coprophilia








EXISTING STRATEGIES (that fell short)

what's been done that are not working

Naturalistic Decorating

Filling up an exhibit with foliage, trees, rocks, and boulders to make the space appear as naturalistic as possible only serves to depict an ideal vision of the wilderness as perceived by visitors. It does very little to address the symptoms of Zoochosis.

Large and Expansive

To a certain extent, spacious enclosures help alleviate the symptoms of Zoochosis, but most often these spaces are void of activities or enrichments the animals can engage in order to stimulate their natural behaviors.

Non-species-specific Generalization

Zoos continue to generalize animal needs not by species and provide them with the few bare essentials of food, water, shelter, and some space to walk around.

Physical Needs

Fulfilling the animal's physical needs is no longer sufficient to enhance the animal's psychological well-being. When the struggle to survive is no longer a priority, nothing is left to stimulate or enrich their welfare.

PREDICTED STRATEGY (that fell short)

what's been visualized but retain existing issues

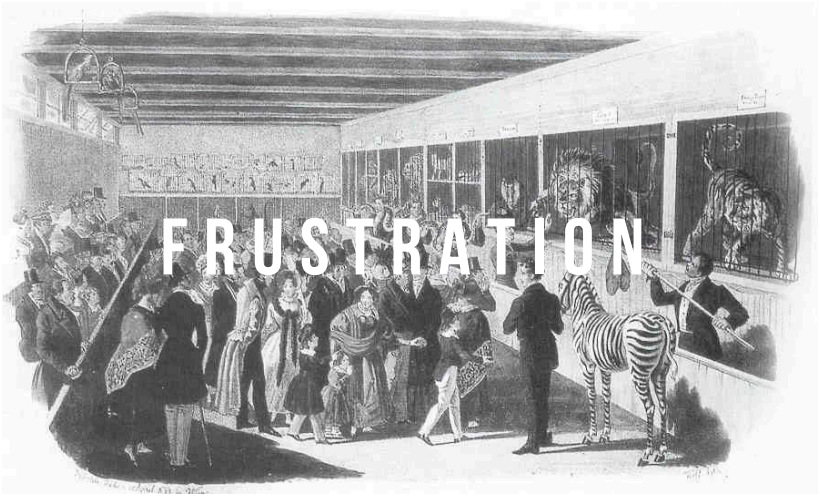
A Zootopia in Disguise

At first glance, Zootopia may have successfully dissolve all barriers between humans and animals. To an extent, it provides an illusion for animals and humans that the enclosure is cageless and expansive beyond boundaries.

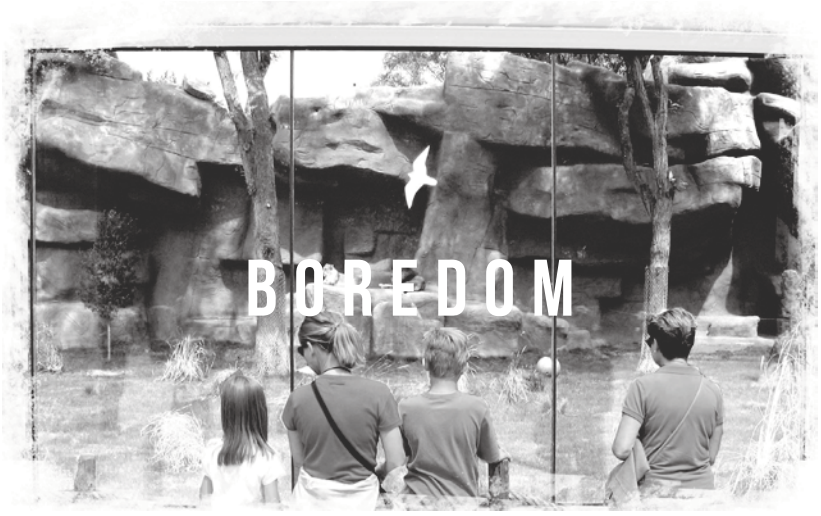
Unfortunately, dissolving barriers is not the main strategy that helps alleviate the symptoms of Zoochosis. An animal may exist in a vast landscape, but without stimulation or enrichments, a zoo enclosure remains as static and inhumane as a cage in a Victorian menagerie.

Zootopia? Not quite.

Bjarke Ingels Group (BIG), **Zootopia**, Denmark, 2014



Menagerie Hermann van Aken, 1833, Austria



Detroit Zoo, 2014, United States

Despite centuries' worth of attempt to make zoos as humane, as cage-less, as naturalistic as possible...

... zoo designs continue to neglect the animals' persistent symptoms of zoochosis.

Fortunately,

solutions are being developed to help alleviate Zoochosis.
One of which is known as “enrichments”.

“ENRICHMENT”

[noun]

AKA “Behavioral enrichment”, “Environmental enrichment”

Enrichment refers to the process of providing appropriate species-specific **stimulation** that encourages and allows the animals to exhibit their natural behaviors.

ENRICHMENT

a step in the right direction

Part of a five-year strategic zoo planning: Big Cat Crossing at Philadelphia Zoo, PA. The Philadelphia Zoo aims to create network of overlapping and interlocking pathway systems for various types of animals in the zoo. Though limited in space, these overground-trails allow the animals to traverse and explore the extense of the zoo at free will.

ENRICHMENT

choices, novelty, discovery

Enrichments: "Toys" for Zoo Animals

Most of us zoo-goers may already be relatively familiar with the types of enrichments selected by zookeepers for each species of animals. But we most likely associate them with make-shift, toy-like objects such as old tires, used metal barrels, beach balls, recycled cardboard boxes, etc. These "toys" are not permanent components of an enclosure, but are temporary additions for the animals to "play". This ensures that an animal's sense of novelty is established each time a "toy" is brought out.

Enrichment has been found to reduce stereotypic behavior **53 percent** of the time.

CORE CONCEPTS

01 / Novelty

Novelty is one of enrichment concepts that constitutes an idea that animals should be allowed to experience newness, unpredictability, unfamiliarity, or even a slight difference within their enclosure. From adding a new object with unfamiliar smell of other species for them to explore or interact with, to temporarily relocating the animal itself to a nearby exhibit occupied by a different species.

According to latest research, animals do not share our sense of time and thus are only able to "live" in the present moment. Hence, reusing the same object or "toy" once every week or two still provides the same necessary novelty to the animals. Over time, this rids them of their sense of boredom, permitting them to be more proactive whilst living in a stationary, confined habitat.

02 / Choices

A zoo exhibit is often static, unchanging, and sometimes outright banal. Their enclosure retains the same faces of a species, familiar characteristics of rocks and trees, mundane routine of activities, etc. Even though animals may not have a sense of future goal or the past, their natural habitat is filled with spontaneity and unpredictability in prey type, scent, sound, varied land and water features, etc. Not only an enclosure needs to have enough varying habitat features and sensory devices, but also different types of ways to move around their own enclosure or even the zoo.

Providing them with a sense of having choices is a starting point to mimic the paths they move along in their own natural habitat. We may not be able to fully give them the space equipvalent to their natural environment, but the illusion of choices of pathways maybe one of the answers.

TYPES OF ENRICHMENT

enrichment aren't just toys!

ENVIRONMENTAL
(passive) ENRICHMENT

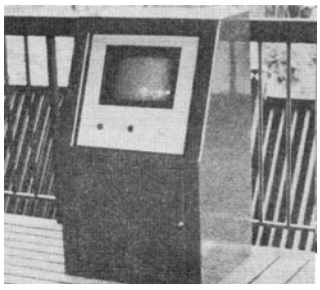
Environmental enrichment devices (EEDs)

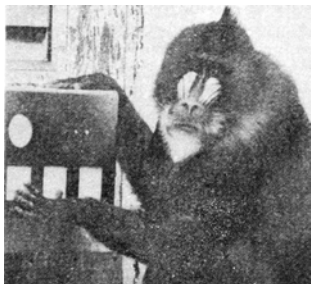
Habitat Enrichment

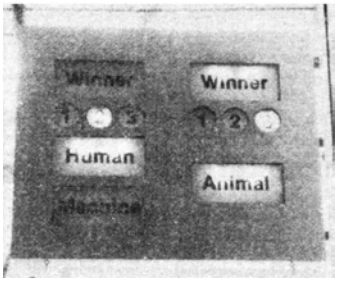
Sensory Enrichment

Food Enrichment

BEHAVIORAL
(active) ENRICHMENT







Methods of engineering the environment for behavioral opportunities at Washington Park Zoo (Oregon), developed by Hal Markowitz

OTHER
METHODOLOGIES

A cheaper alternative: Animal Drugs

Animal Sanctuary

"Specialist" Zoos

Return to the Wilderness

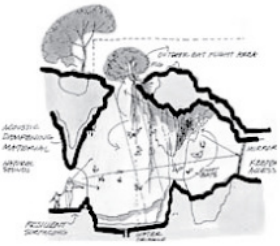
JON COE - master of environmental enrichments

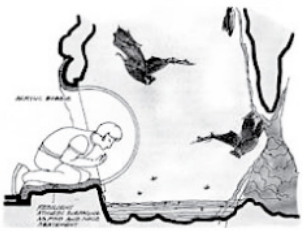
integrated enrichment strategies

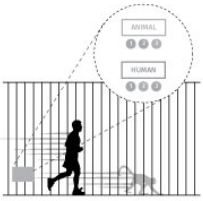
JON COE is an Australian landscape architect and zoo designer with thirty years of planning and design experience. Coe promotes design enclosures that are designed and built around a specific animal's behaviour. Immersion design, activity-based, and rotational design are some of his own innovative approaches to exhibit design.

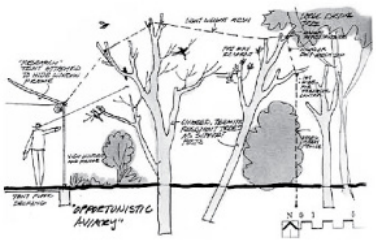
He also categorised different types of zoo that have emerged during the past century as well as predicted the kinds that may be developed in the next twenty-five to thirty years. This includes the 'Unzoo' alternative strategy that he believes is a progression towards the 'ideal zoo'.

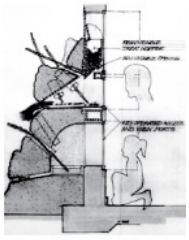
Remaining only well-known in his respective field, Coe's innovative strategies for zoo design are used as models around the world, including a latest design by Bjarke Ingels to be built in Denmark.

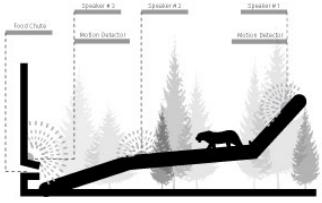


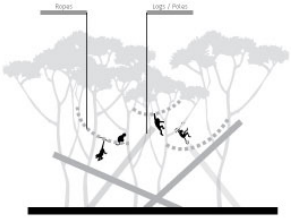


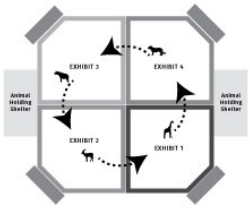


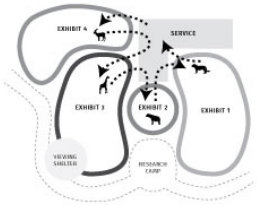


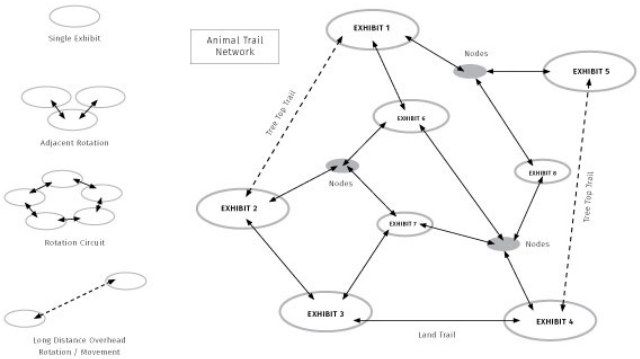












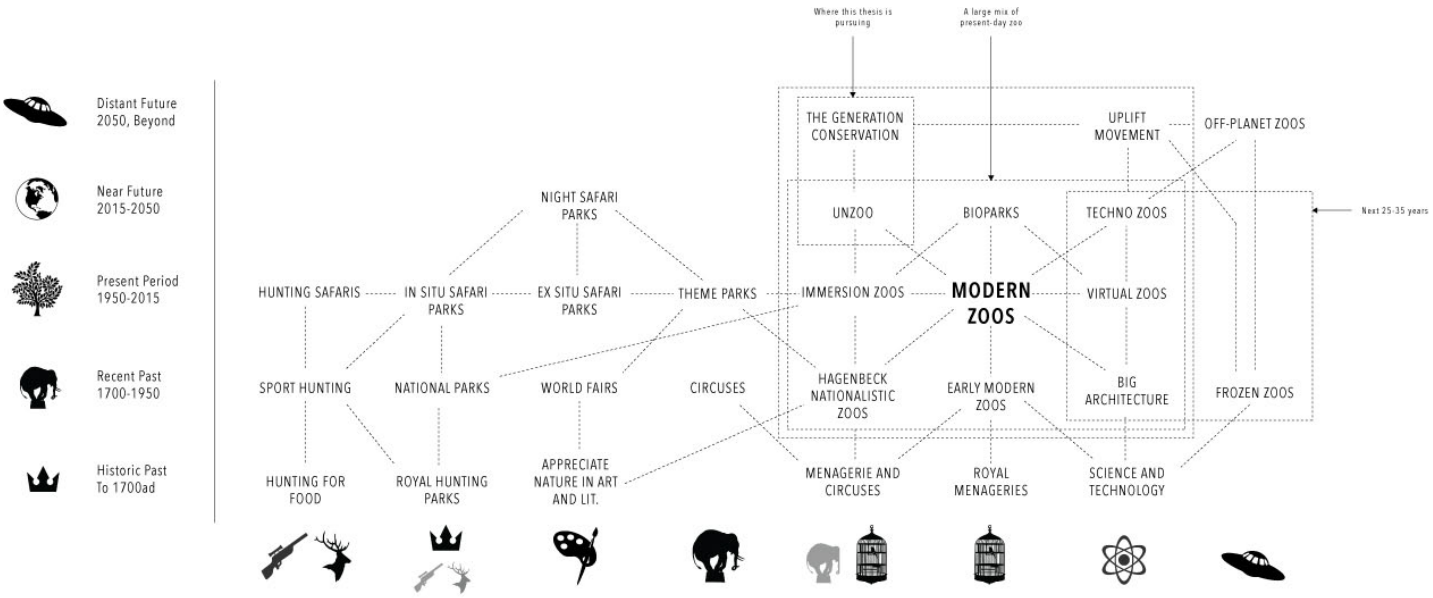
Ideas of introducing **novelties** and **choices** for the animals are central to most of his work.

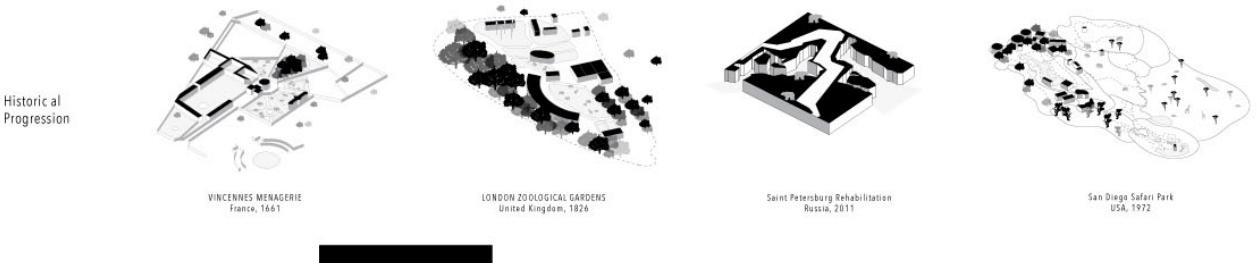
As effective as these strategies are, they are 'passive', as in there is little to no human interactions required for these to work.

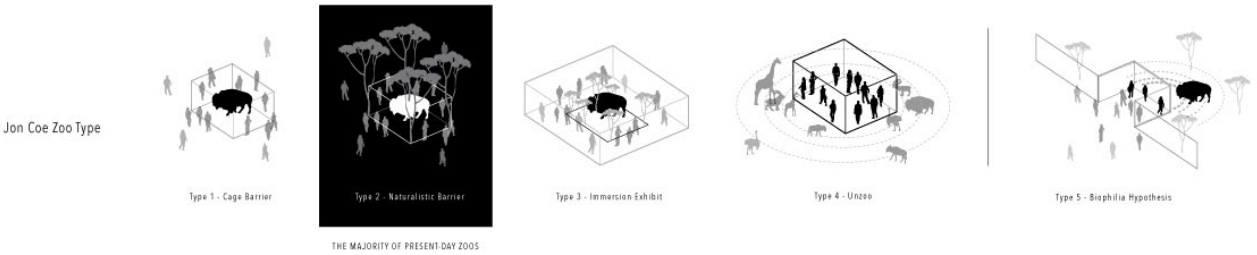
MAPPING THE EVOLUTION OF ZOOS

Coe illustrates and categorizes zoos of varying purposes and time period to get a better base of understanding of where zoos have been and where it could move towards. He claims that like any other evolution of natural beings, zoo evolution is also non-linear. Zoo evolution does not run move along a diagonal curve starting with the royal menageries, to Victorian zoos, bioparks, and ending with paradise. Instead, a tree-like image is more suitable to describe this evolution.

The same zoo typology that exists a thousand years ago can still exist today and into the future. With royal menagerie placed at the bottom left corner does not mean the typology no longer exists, but 3,500 years ago, a menagerie exists in Egypt as it does in the present of a slightly different variants.







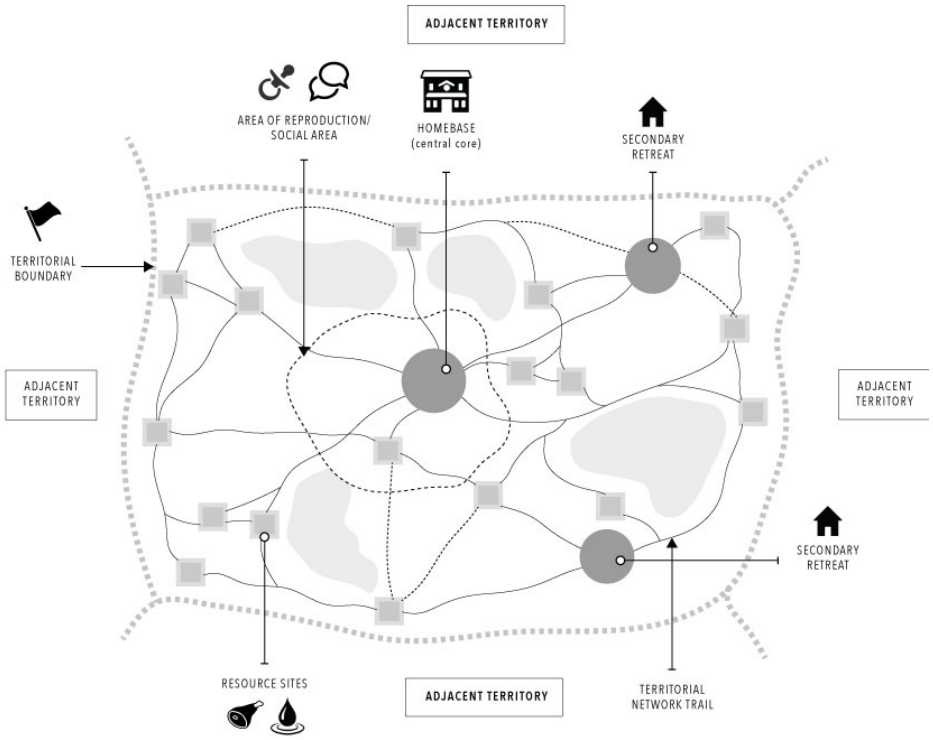
THE MAJORITY OF PRESENT-DAY ZOOS

HEINI HEDIGER

concept of territory and zoo rotation combined

Heini Hediger, a swiss biologist and known as the “father of zoology”, has developed the concept of homerange or territory. According to Hediger, an animal’s territory is not simply a homogeneous area. It consists of one home base and a few crucial secondary retreat areas. But the majority of the territory is a large, encompassing trail network that connects the base to the resource sites.

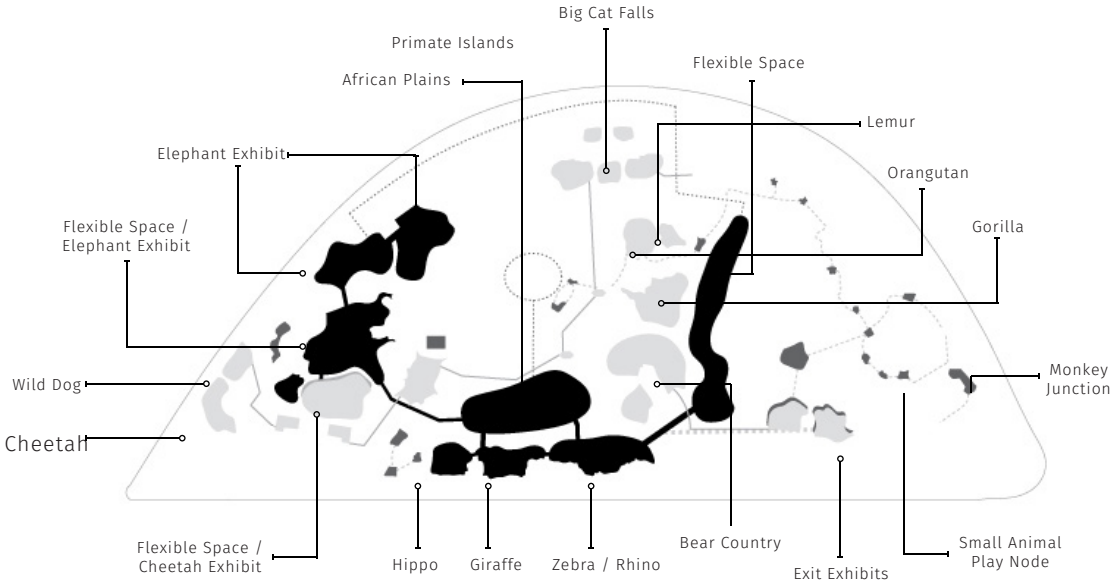
These resource sites include water holes, salt licks, hunting area, foraging area, social and mating area. The area of the territory can expand significant, but the feature that the animal uses most frequently is the trail. Rare does the animal venture of this trail network as they less efficient and unexplored.

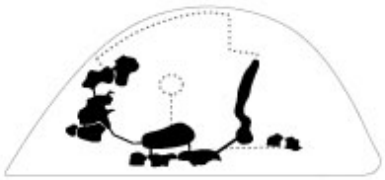


PHILADELPHIA ZOO

Philadelphia Zoo's new five-year Strategic Plan calls for the transformation of America's oldest zoo. The small (42 acre) urban site can't expand, so the plan is to "turn the zoo inside out" by interconnecting all of the animal areas with an interconnecting trail network.

Jon Coe and CLR Design developed an innovative zoo-wide animal trail system that interconnected the whole zoo. This provides the animals unprecedented opportunities for discovery, enrichment, and exercise.





Potential Future
Large Animal Raceways

Medium & Large Animal Raceways
(great apes, big cats, bears)

Existing Primate Raceways

EVOLUTION OF ANIMAL DISPLAYS

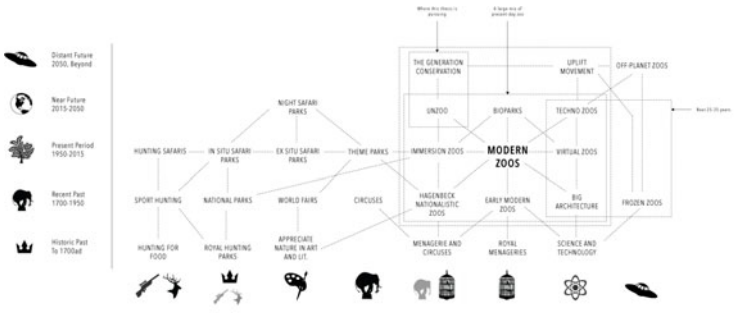
shaping our ideals of animals with zoos

Predecessors of zoos date back to the animal collections of ancient history when wealthy civilizations took great interest in collecting exotic animals. Around 1400 BC, Queen Hatshepsut of Egypt sponsored various expeditions to collect giraffes and cheetahs which were seen as representatives of the gods. While in 1,000 BC, Chinese emporor Wen Wang established the famous "Garden of Intelligence" displaying deer, antelope, and pheasants. Not only the animals were kept for pleasure and amusement, in the 4th century B.C. Aristotle also studied animals sent back to Greece during Alexander the Great's conquests. These animals later became the inhabitants of one of the first public zoos as an educational institution.

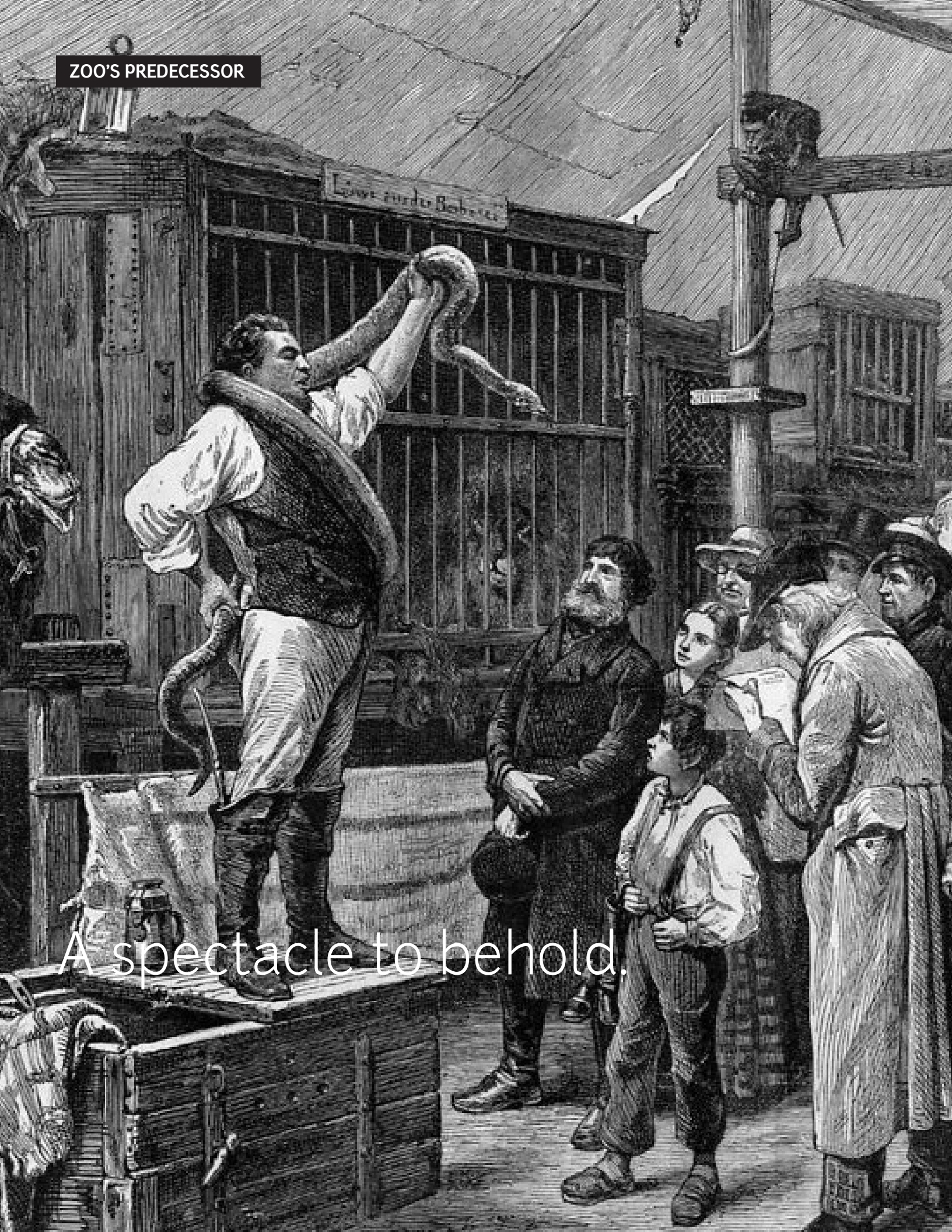
In the year 1235 in England, exotic animals from further corners of the world were shipped and kept in a menagerie of the Tower of London to display Henry III's power and wealth. The 'Royal Games' where lions, bears, and dogs were made to fight was a popular event for the royalities. Menagerie keepers were often uneducated about the animals that were stored in cramped cages. They were often fed with food that was not part of their natural diet and thus many died young while in captivity.

It was not until the 1750s when royal menageries became strong symbols of status and power. Viewing animals on displays was a privilege only for the wealthiest. The glorification of the animals was commonplace for the ruling classes' private amusement and curiosity. Considered the very first real zoo is the Imperial Menagerie at Schönbrunn Palace in Vienna, which existed as a private menagerie for the imperial family since 1752, and later opened to the public in 1765.

Today, the term 'menagerie' refers any small collection of exotic animals which is often considered below 'zoo' standard. (image right)



ZOO'S PREDECESSOR



A spectacle to behold.

EVOLUTION OF ANIMAL DISPLAYS

from pre-modern to eco-zoology

PREMODERN

The root of modern zoos stems from the creation of menageries in the 16th century, catering to display exotic animals to the royalties and aristocrats. Its purpose was primarily the demonstration of power and wealth amongst the wealthy, particularly in England and France. The more exotic animals you owned, the more powerful you appeared. Animals were housed in inhumane conditions of small, dark, damp cages with little to no maintenance. Entertainment was also a crucial aspect of the menagerie where animals were forcefully brought out to fight with each to the death.

NOAH'S ARK, Book of Genesis

Despite the religious debate of its existence, the Noah's Ark symbolises the rescuing of animal species around the world in a single contained space. It embodies the concept of what zoos are claiming to focus on today: protecting endangered species and conserving the exisiting ones.

ROYAL MENAGERIE
Tower of London, UK, 1204

For 600 years, animals such as lions, tigers, kangaroos, and ostriches were kept here for the king's entertainment. Platforms above each den serve as stages for animals to fight each other to the death.

VINCENNES MENAGERIE
Vincennes, France, 1661

Animals of different species played different roles in 'entertaining' the royalties. Exotic birds and small animals serve as "ornaments" while the larger faunas such as lions were only brought out for a show in a fight. The menagerie itself is located within the palace grounds and was organised in a circular layout. The center of the layout situates a pavlion, with walking paths and animal cages on the outer rings.

MODERN

By the 19th century, aristocratic menageries were displaced by modern zoological gardens that placed greater emphasis on scientific and educational endeavors. With the emergence of the Age of Enlightenment, there developed an interest in the natural world. Mostly founded and owned by aristocrats, pre-modern zoos primary intentions were not scientific or educational but rather to illustrate their established power and wealth as it required both of those conditions to acquire exotic animals.

TIERGARTEN SCHÖNBRUNN
Vienna, Austria, 1752

Situated on the famous Schönbrunn Palace grounds, the zoo was founded as an imperial menagerie and is one of the oldest zoos in the world to regard itself as a scientifically administered zoo with species conservation as its main purpose.

LONDON ZOOLOGICAL GARDENS
London, UK, 1826

Inspired by Hamburg Zoo, the London Zoo brought the animals out into the open which led to newer designs of the enclosures. (From Tuscan Giraffe House and Elephant House, to Snowden Aviary and Mappin Terraces)

TIERPARK HAGENBECK
Hamburg, Germany, 1907

It was known for being the first zoo to use open enclosures surrounded by moats. The moats separate the animals that did not swim, one could look across an expanse of the zoo and see many animals at once, as if in the wild

ECO-ZOOLOGY

These projects combine performative elements with visual interest to create a hybridized, experiential interaction with humans and animals. These zoos aspire to encourage interactivity between people and nature, in a way that observation does not disturb activities in nature. Interest in preserving local biodiversity within both urban and rural contexts is informing the sustainably driven design proposals for future zoological park rehabilitation projects. There seems to be a newfound appreciation for observing natural processes and patterns. My personal insights and critiques are added to each projects below.

KORKEASAARI ZOO REHABILITATION
Beckmann-N'thepe + TN Plus
Helsinki, Finland, 2008

Comprising of four biozones exhibits, the formless new Helsinki Zoo dissolves into the geography of landscape and water features, infusing the natural sensibility and artificiality of the modern space. Animals dwell in exhibits that mimic its natural habitat but a physical barrier still exist between the visitors and the exhibited animals.

OYSTERTECTURE
SCAPE, Kate Orff
Brooklyn, NY, USA, 2010

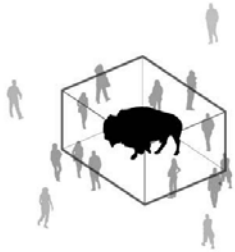
Oyster-tecture takes advantage of animal's behavior and life cycle to greatly influence the project's design approach, in this case using biotic process of oyster. It aims to address the issues of water quality, rising tides, and community based development with the creation of mega reef structure and the harnessing of the oyster's biological abilities. Seamless coexistence between two species are essentially ideal, the question is whether we can apply this concept to large faunas?

ZOOTOPIA
Bjarke Ingels (BIG)
Givskud, Denmark, 2014

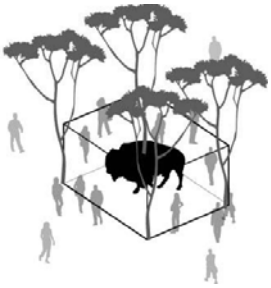
Bjarke Ingels Group has developed an ambitious design that redefines (and reverse) the meaning of a zoo. In a nutshell, BIG created a zoo space that provides "the best possible and freest possible environment for the animals' lives and relationships with each other and visitors." The proposal is ambitious, however the sole experience still remains with mere spectorship, no further interactional activities are offered to the visitors.

JON COE ZOO TYPOLOGY

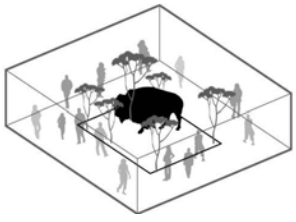
Series of diagrams below illustrates Jon Coe's own zoo typology which includes his own speculative prediction for what the future of zoos could head.



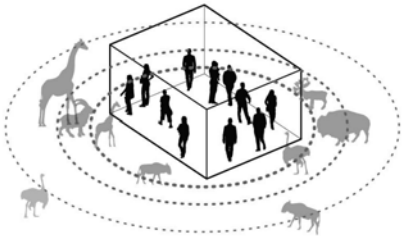
Cage Barrier



Naturalistic Barrier



Immersion Exhibit

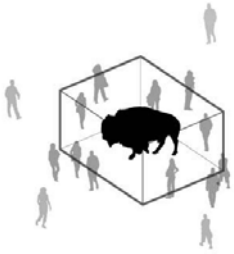


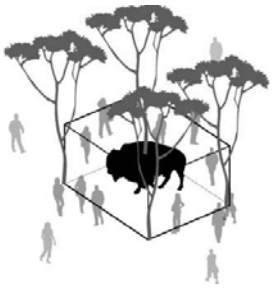
Unzoo

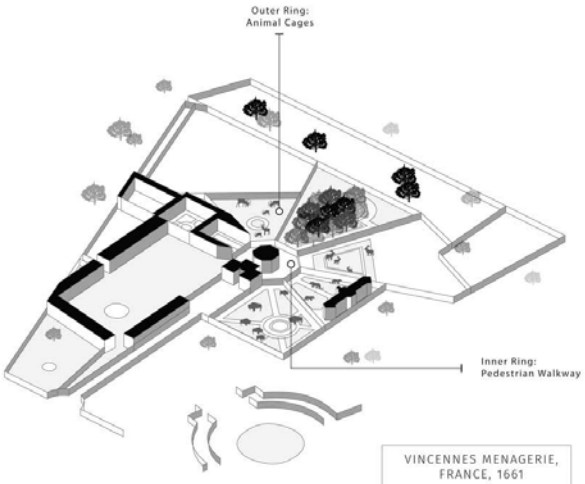
Unzoo is Jon Coe's latest classification of zoos and the type that he believes to be the "progression towards an ideal". Coe explained that Unzoo is where animals and nature dominate the zoo rather than the human visitors.

Animals in the exhibit are "attracted" to move into the visitor's view rather than confined and exposed to 24/7 observation. Here, humans and animals are encouraged to interact, resulting in collaboration and mutualism. Humans are controlled and contained while the animals are "loose". A prominent example is the San Diego Safari Park.

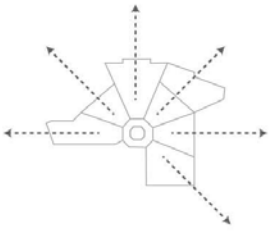
EVOLUTION OF ANIMAL DISPLAYS



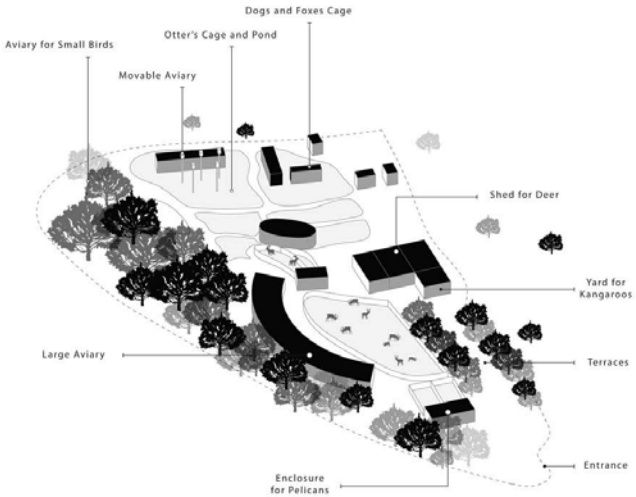


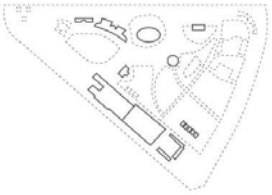


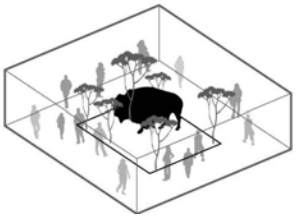
VINCENNES MENAGERIE,
FRANCE, 1661

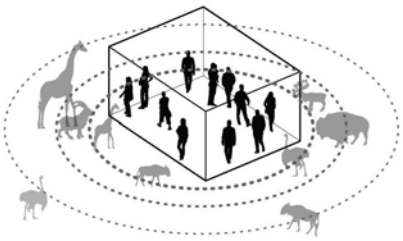


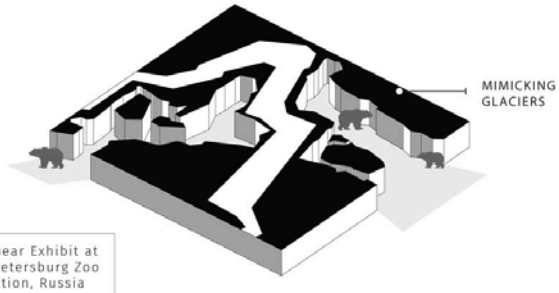
GARDENS OF THE ZOOLOGICAL SOCIETY,
LONDON, UK 1826





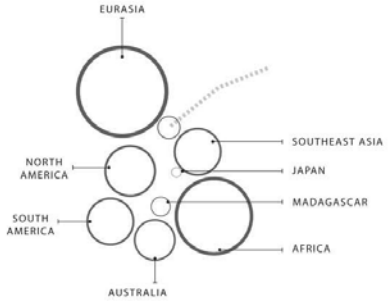


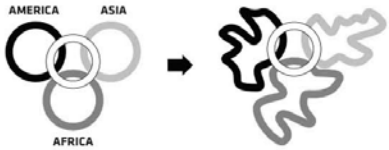




Polar Bear Exhibit at
Saint Petersburg Zoo
Renovation, Russia

San Diego Zoo
Safari Park Masterplan





ZOO PRECEDENTS

The reimagined zoo that I am proposing are almost unprecedented as behavioral enrichments in zoos are often isolated pieces or non-integrated additions to the zoo. These enrichments are often non-interactivity and the sole activity that visitors can engage in is spectatorship. Animals are still mere objects for show and awe. These precedents below are more for my own reflection or even criticism on where zoos are heading in the near future.

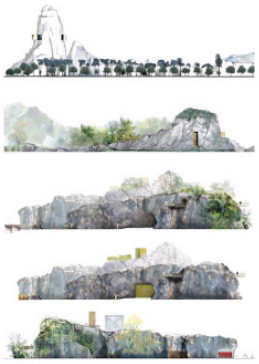
A reflection on BIG's Zootopia.

Overall, the ambition to create an open relationship between animals and visitors is bold and successful to some extent. The cagefree exhibits certainly generate great sense of immersion for the visitors. However, the proposed parti diagram (left) is somewhat misleading. To me, Zootopia is still classfied as a safari-type zoo where visitors are inside a certain vehicle, physically separating them from animals. This is understandable in terms of safety however, there is still little room for real interactions between visitors and the animals. May the solution/mission isn't to make it as free as possible. Us architect should not forget we are not converting a zoo into a natural preserve.

BIG, Zootopia
Denmark



TN Plus, Paris-Vincennes
France



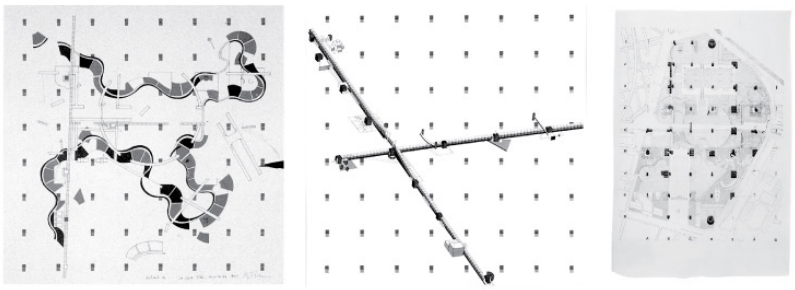
TN PLUS and Beckmann
N'Thépé, St. Petersbrug Zoo
Russia



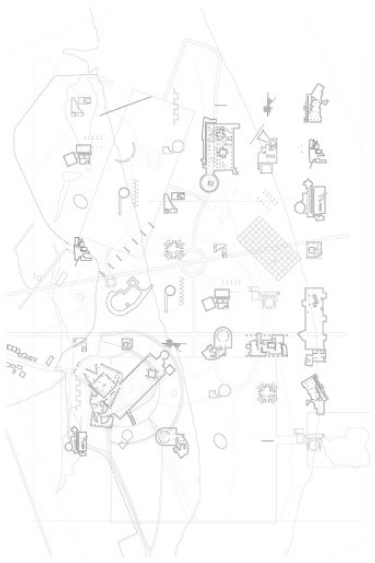
NON-ZOO PRECEDENTS

The reimagined zoo that I am proposing possesses these specific qualities: interactivity, field conditions, playful follies, animal playground. These architectural precedents below are the types of features and tectonics that I wish to achieve.

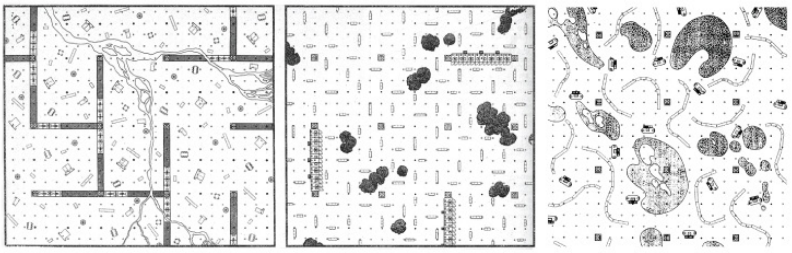
Kieran Thomas Wardle,
The Eastminster Palace



Rem Koolhaas,
Parc de la Villette

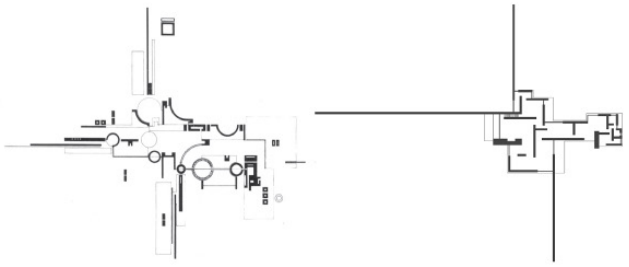


Archizoom,
No Stop City

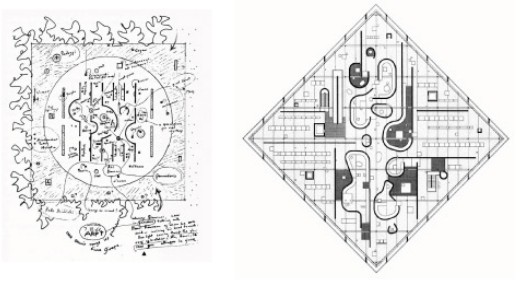


Bernard Tschumi,
Parc de la Villette

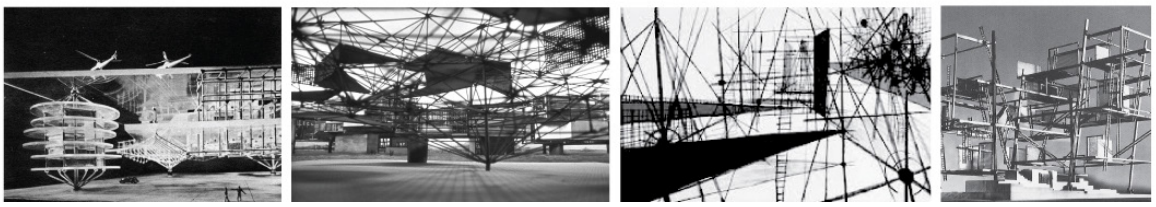
Aldo Rossi,
Plan of a Foundry



Mies van der Rohe,
Brick Country Home

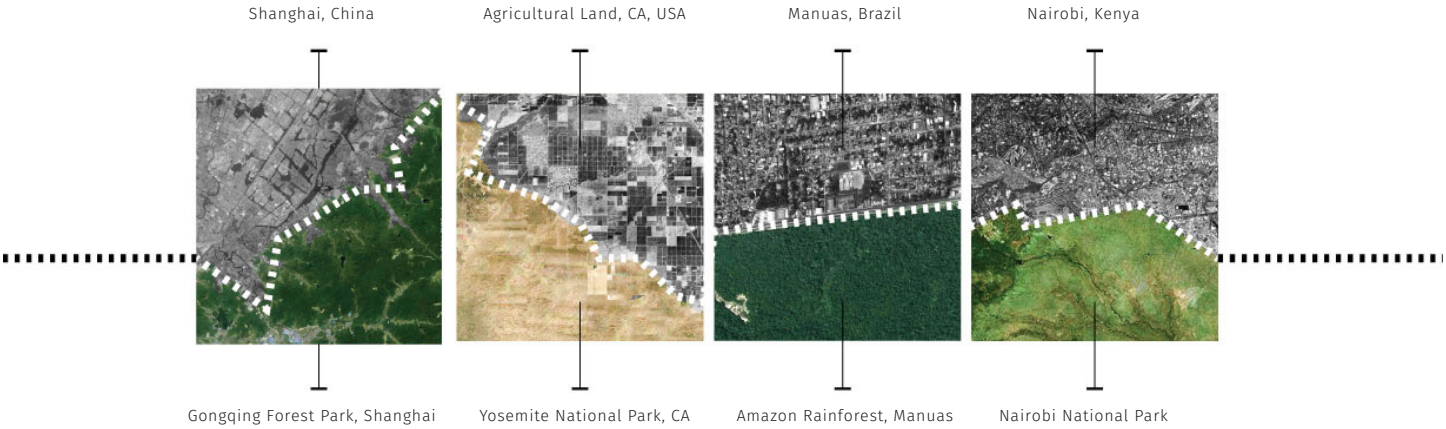


Constant Nieuwenhuys,
New Babylon



WHY WE NEED ZOOS

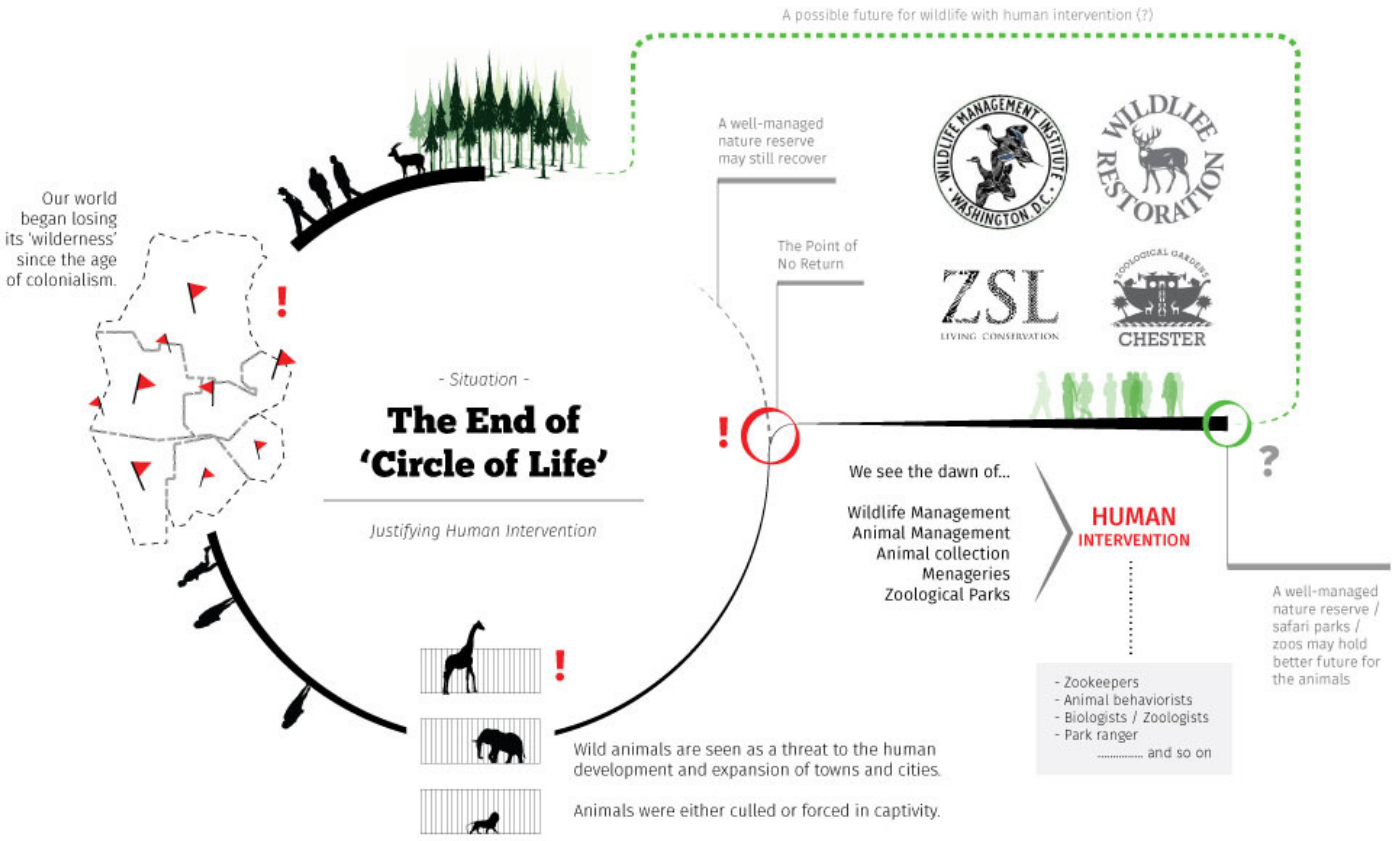
justifying the existence of zoos



"Nature" is an emotive word. People often associate it with the concept of being "free". On the contrary, today nature is enclosed, confined, and boundaried. Nature survives in 'islands' squeezed in by cities, urbanised developments and agricultural farmlands.

Today, national parks and reserves are what we associate with the wilderness. But they are the evidences and the result of our ever-expanding towns and cities. These reserves are heavily monitored, maintained, and managed by us humans; it is far from being "wild" and "free". Below are examples of the existing boundaried conditions between national parks and dense, contemporary cities.

As cities further push their boundaries into the wild, animals are forced to relocate elsewhere as their habitat shrinks. Most often they are culled or put into zoos. Eventually the human population will surpass the amount of space available, leaving no place for the animals to live in its own natural habitat. Zoos will either become a sanctuary or a slaughterhouse for these immigrated creatures.



An infographic that examines the timeline of human colonisation of the natural landscape, dividing them up with administrative boundaries of our own, tearing up animal's natural habitats into fragments and throwing them into zoos for the public's entertainment.

SITE SELECTION

where could a reimagined zoo be situated?

"...Britain is a zoophobic nation. While other European countries rewild to great success, we are shamefully disconnected from our wild past of wolves... and our timid, visionless conservation movement is complicit."
- George Monbiot

According to Monbiot, sending money to poorer nations and applauding Europe for their work of rewilding successes seems to be the extent that Britain are willing to participate to this issue. Since 1970 in Europe, wolves and lynx population have quadrupled, with roughly 12,000 wolves and 10,000 lynx on the continent. This substantial progress would not have been achieved without strong campaign work by organisations such as **Rewilding Europe,** as well as the public's gradual acceptance of the wolves' reappearance.

"Most of our conservation areas aren't nature reserves at all. They are museums of former farming practices."

Wildlife and biodiversity in Britain are diminishing. British national parks are layered with human interventions of agriculture, quarrying, and mining. These parks are not populated with wildlife as one might expect. A recent **State of Nature** reported that wildlife species in Britain is declining at the rate of 60% (65% in the uplands). Additionally, **Rewilding Europe** only listed three mammal species that are considered 'thriving' in Britain: grey seal, roe deer and red deer. **Tree of Life** and Alladale Estate's rewilding project in Scotland are two of the few campaigns that strive to return wildlife to Britain. Bringing back species such as wolves and lynx can help restablish biodiversity, enable woodlands to regrow, and help people reconnect with the environment.

"The places that should be our wildlife reservoirs are in fact wildlife deserts."

Peak District National Park, Sheffield, United Kingdom

A SITE SELECTION

“Britain: A Zoophobic Nation”

SITE SELECTION

where could a reimagined zoo be situated?

The proposed site is located in Sheffield, bordering Peak District National Park. The park's breathtaking views and majestic mountainscapes often mistaken visitor for its remarkable biodiversity and wildlife. Conversely, most of the landscape features here are purposedly kept open and bare for farming and other agricultural production. Over 86% of the park is classified as farmed land where the landscape is mostly grass or rough grazing for dairy cattles and sheep.

The park only consists of small mammals such as mountain hare, otters, polecats, and hedgehogs. Large predators such as wolves disppeared over 500 years ago. Bordering the park is the city of Sheffield where industrialisation and modernisation thrived. The proposed rewilding facility will act as a mediator and connector between the dense, urban city with the natural landscape of the park. The facility's close proximity to the city will encourage city-dwellers to experience the outdoor and wild animals in a new and enriching way.


DARTMOOR
7.2 miles
19 min drive
EXETER
LAKE DISTRICT
1.3 miles
6 min drive
KENDAL
PEAK DISTRICT
4.3 miles
15 min drive
SHEFFIELD
FOREST OF DEAN
11.2 miles
26 min drive
GLOUCESTER

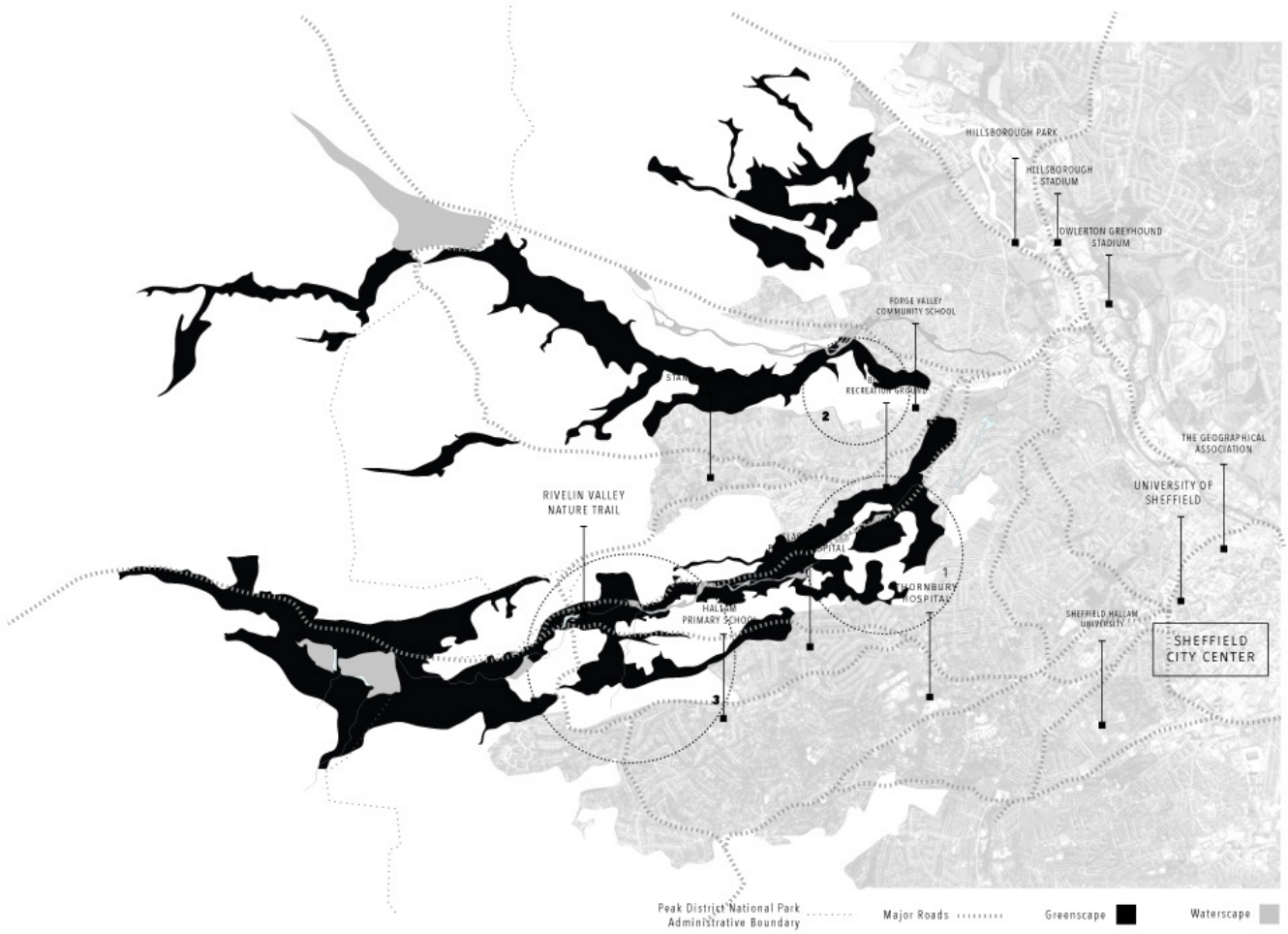

nature reserve
domesticated land
city center

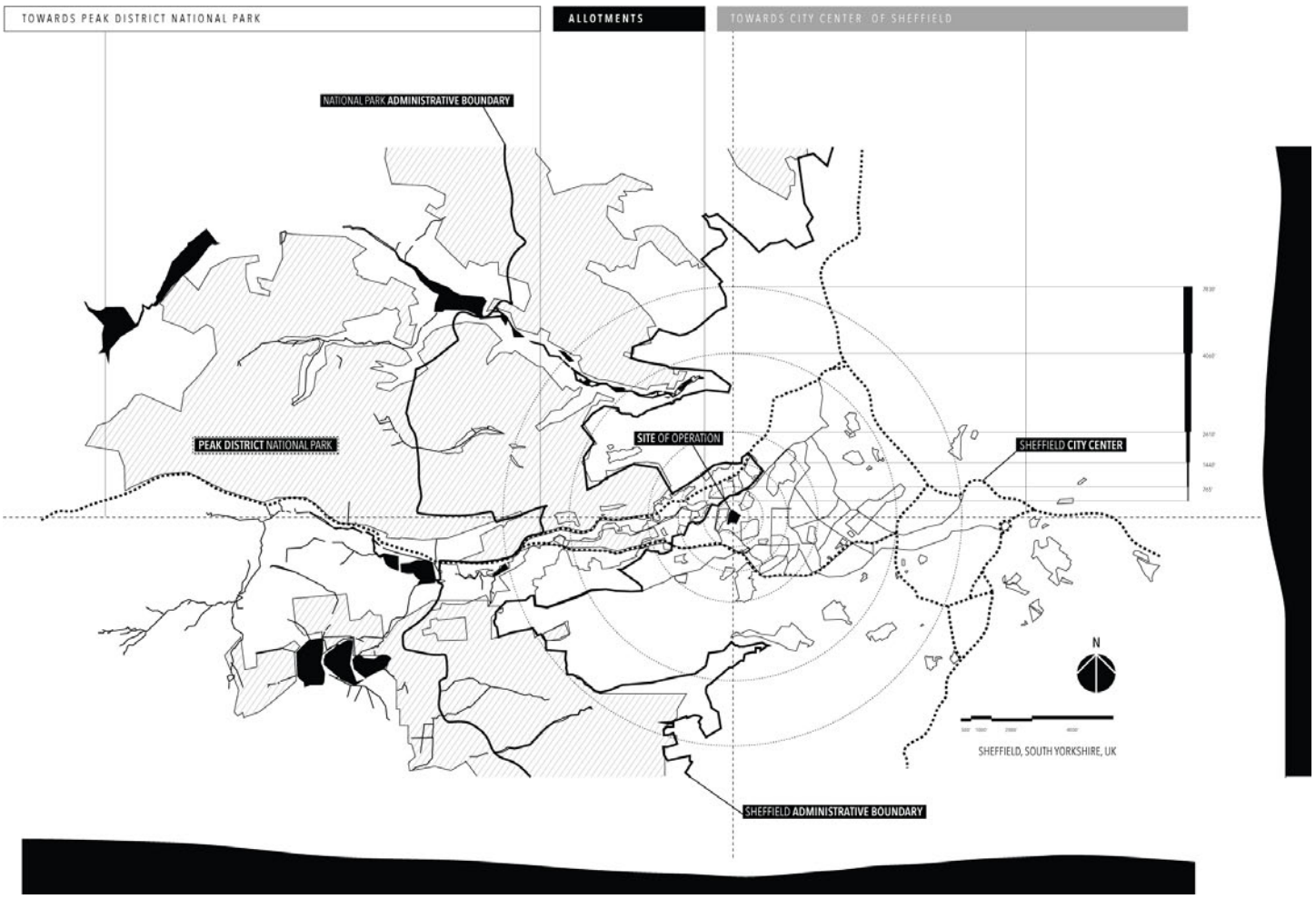

PEAK DISTRICT
4.3 miles
15 min drive
SHEFFIELD


driving distance

SITE SELECTION

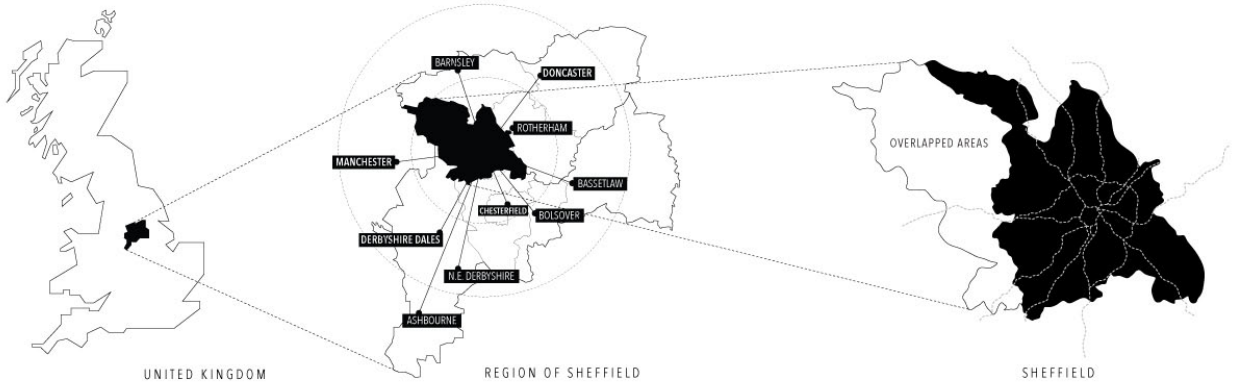
Sheffield, United Kingdom




TOWARDS PEAK DISTRICT NATIONAL PARK
ALLOTMENTS
TOWARDS CITY CENTER OF SHEFFIELD
NATIONAL PARK ADMINISTRATIVE BOUNDARY
PEAK DISTRICT NATIONAL PARK
SITE OF OPERATION
SHEFFIELD CITY CENTER
N
SHEFFIELD, SOUTH YORKSHIRE, UK
SHEFFIELD ADMINISTRATIVE BOUNDARY

SITE SELECTION

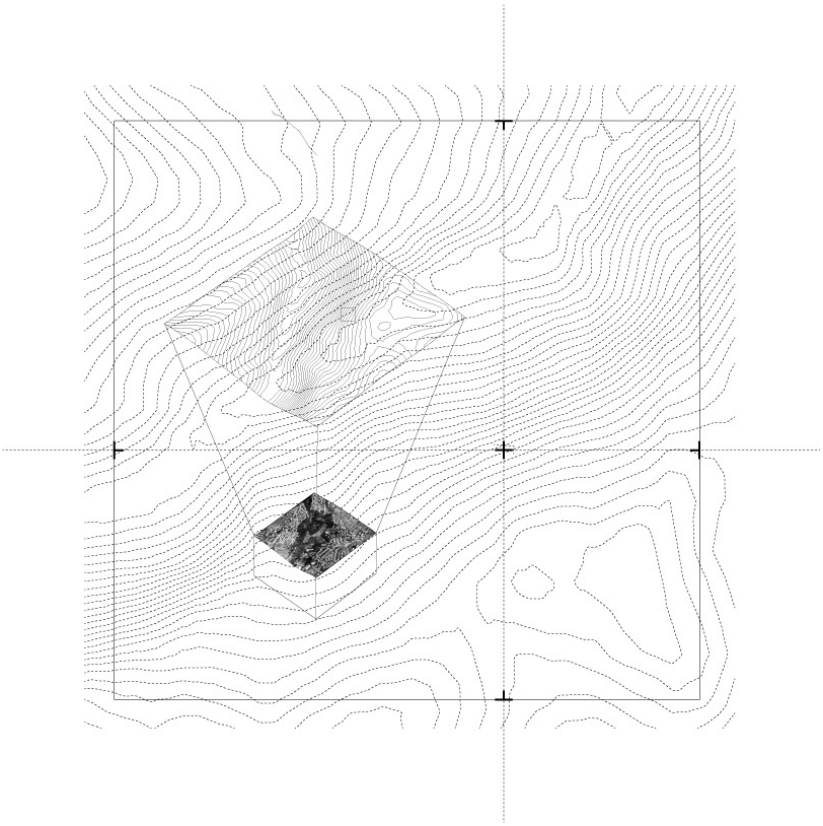
Sheffield, United Kingdom



Full Context

Roads / Pathways
Intersection

Roads / Pathways
Intersection



Allotments Directionality

SURFACE AREA
COMPARISON

(images not to scale)

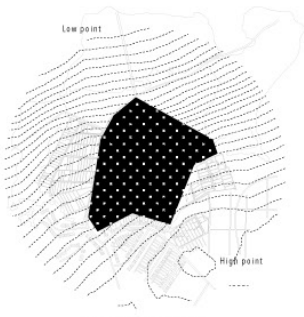
LOS ANGELES ZOO, LA
133 acres

ZSL LONDON ZOO, UK
21.3 acres

THE ZOOLOGICAL PARADOX
17.6 acres

SAN DIEGO ZOO, CA
99 acres

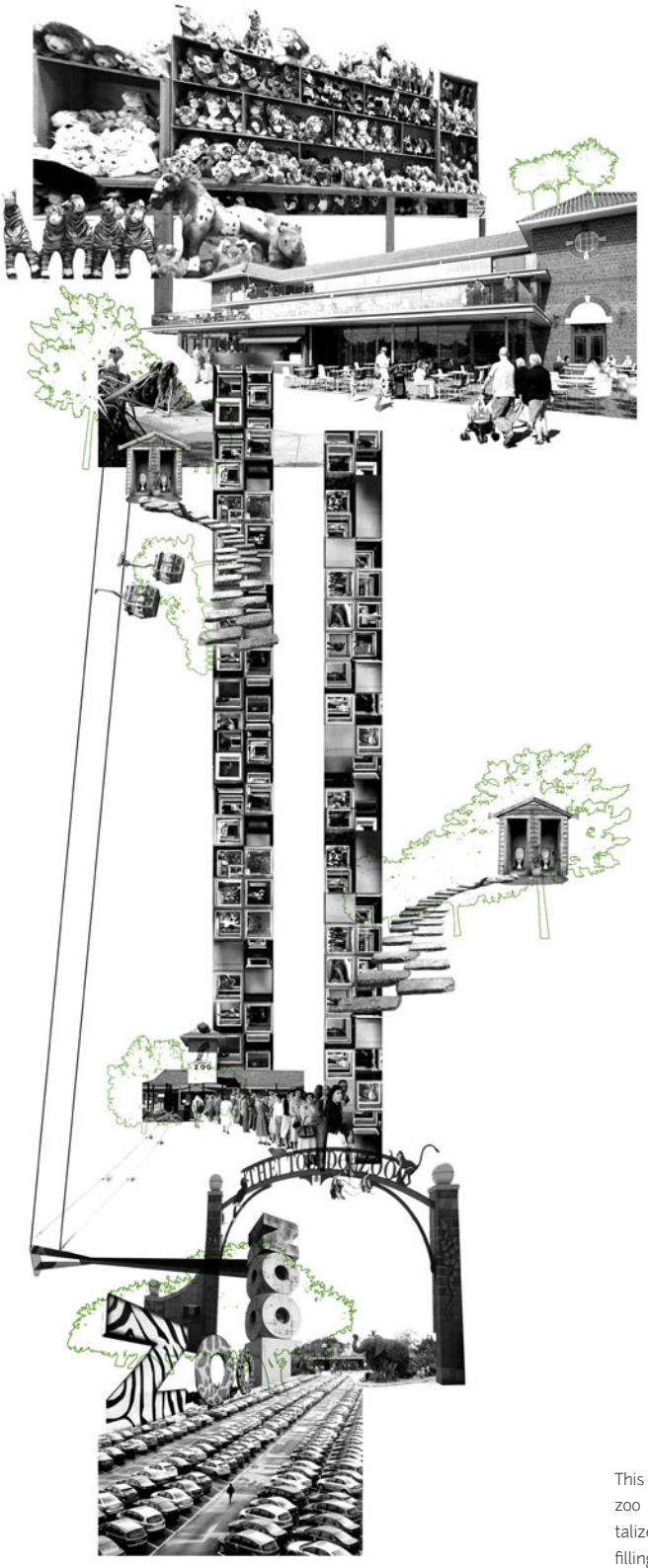
ROSAMOND GIFFORD ZOO, NY
43 acres



Topography (30' interval)

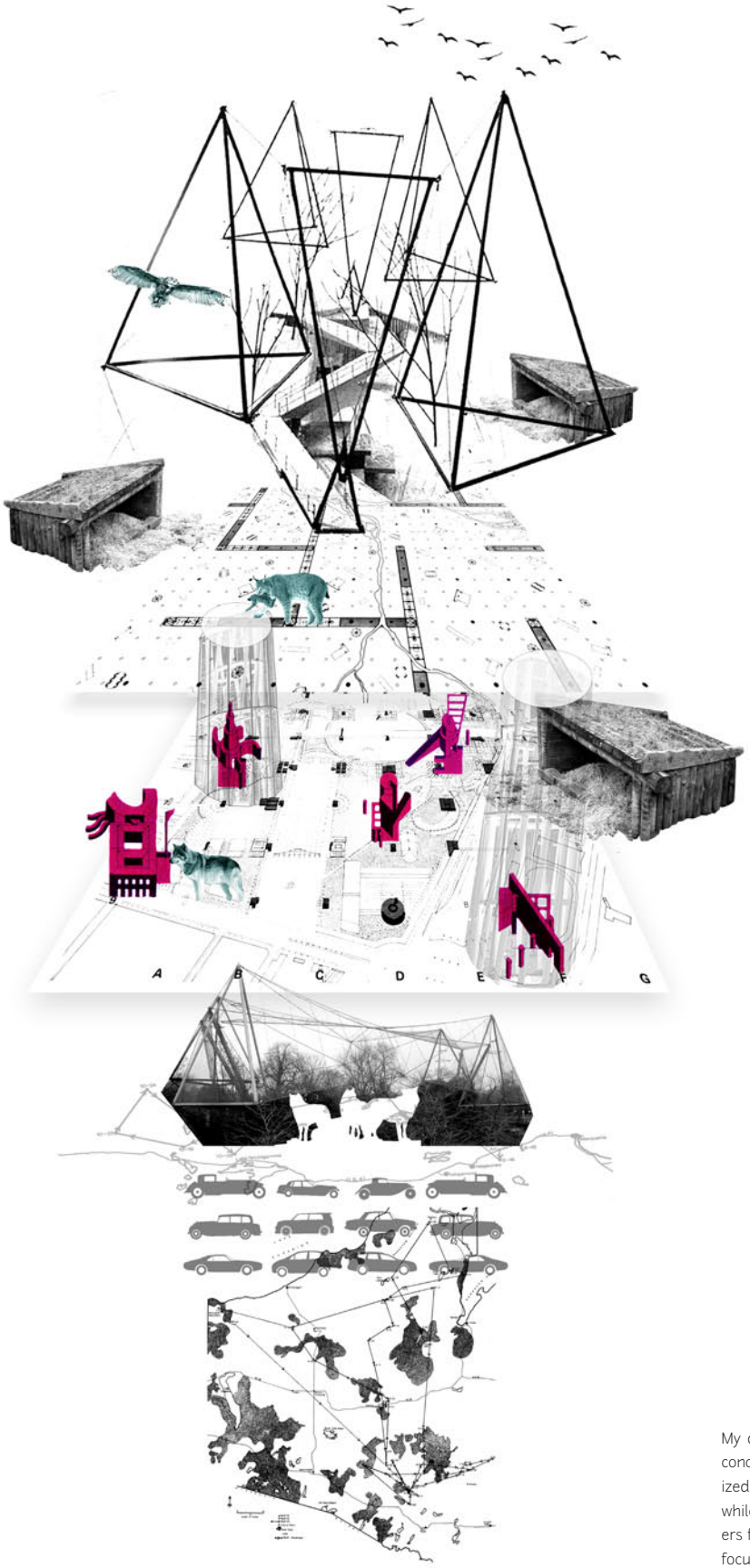
A CONVENTIONAL ZOO

These collages begin to conceptualize all these ideas that I have researched, converging them into two images.



This one depicts the existing 21st century zoo typology: a conventional, compartmentalized, picturesque zoo with the focus fulfilling animal's everyday needs (food, water, medicine, clean shelter, etc) and the sole activity for visitors is spectatorship. A zoo that only caters to fulfill the visitors' entertainment and their ideal perception of wildlife.

A REIMAGINED ZOO



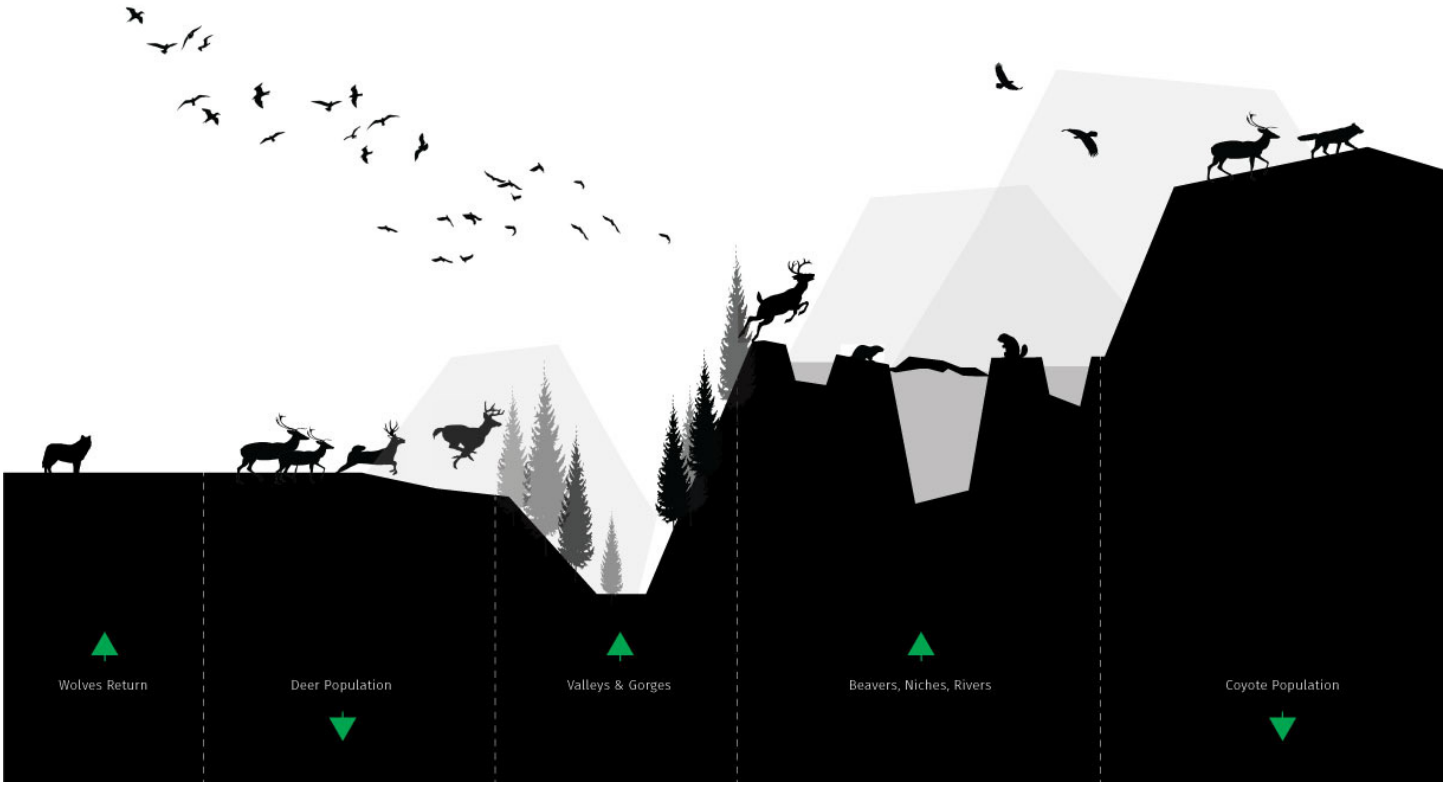
My design challenges this model with this concept of a zoo that is non-compartmentalized, existing in an open, field-like condition while not being afraid of the need for barriers for practical uses. It is a zoo that mainly focuses on fulfilling the animal's psychological welfare all the while with the participation of zoo visitors.

PARTICIPATING SPECIES

According to latest studies, the UK is currently undergoing great excitement and support to the reintroduction of these three species to the British landscape; the gray wolf, Eurasian lynx, and the eagle-owl. These are all apex predators that have large impact on an ecosystem they inhabit. They have also been known trigger the event of the Trophic Cascade (in particular the gray wolf).



"Trophic Cascade"

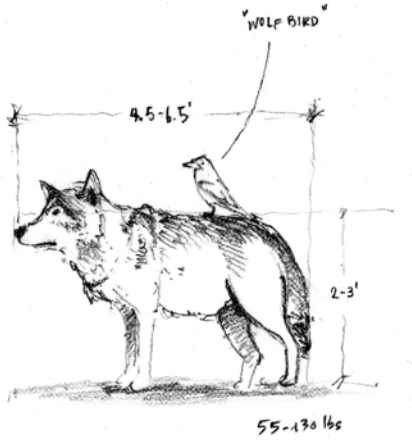


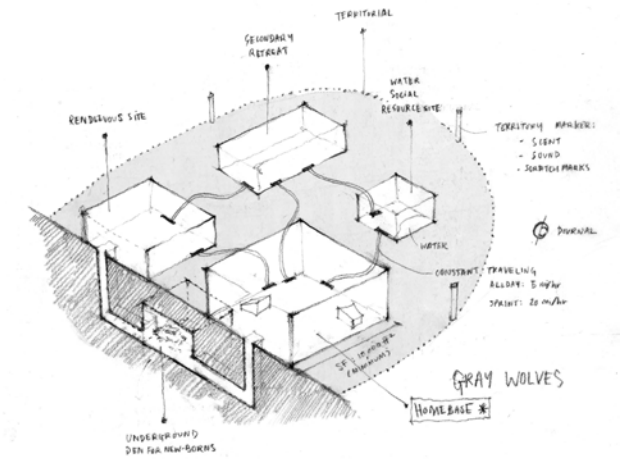
EURASIAN GRAY WOLF

Dense Forests

Arctic Tundra

Dry Shrublands





FAST FACTS

Type: Mammal
Diet: Carnivore
(tend to prey on large ungulates: hoofed animals like elk, deer, and boar)

Average life span in the wild: 6-8 years
Average life span in the captivity:13-17 years
Size: Head and body, 36 to 63 in; Tail, 13 to 20 in
Weight: 40 to 175 lbs
Group name: Pack

Geography: Have the largest natural range of any land-based mammal besides humans
Habitats: Able to live in many biomes, from Arctic tundra to dense forests, to mountains, to dry shrublands.

UNIQUE CHARACTERISTICS

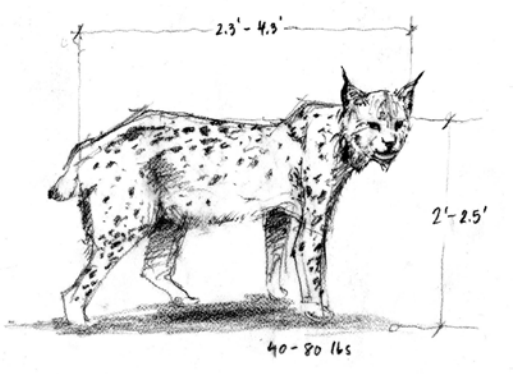
- Diurnal (active day and night)
- Highly social & territorial
- Lives in packs with strict hierarchy
  "Pack" = 1 breeding alpha male and female and subordinate offsprings of at least 1 year old (usuall 8-20 wolves)
- Spends 35% of day travelling
  (at least 20-30 mi/day)
- Spends 50% of the time in core of territory
- Pups are born blind and deaf, live in underground dens
- Hunts by scent and sound (can hear upto 6 mi)
- "Wolf-birds" = social attachment to wolves
- Marks territory with scent, howling, and scratch marks

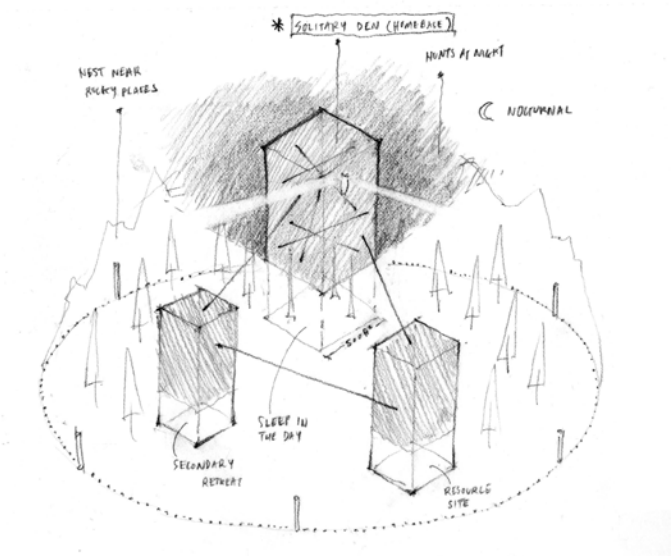
EURASIAN LYNX

Rocky Outcroppings

Dense Forests

Tibetan Plateau





FAST FACTS

Type: Mammal
Diet: Carnivore

Average life span in the wild: 6-8 years
Average life span in the captivity:13-17 years
Size: Head and body, 32 to 40 in; Tail, 4 to 8 in
Weight: 22 to 44 lbs
Protection Status: Threatened

Geography: Remote northern forests of North America, Europe, and Asia
Habitats: Dense forests, habitat with rocky outcroppings

UNIQUE CHARACTERISTICS

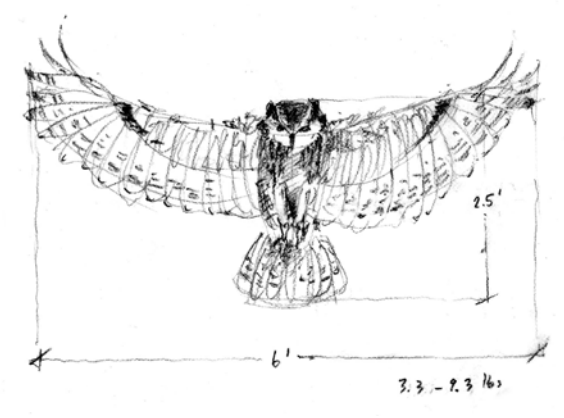
- Crepuscular (active at dusk and dawn)
- Highly solitary, requiring separate territory per lynx (competitive amongst themselves)
- Prefers forested habitat with hiding areas
- Hunts and stalks prey from vegetation cover
- Marks territory with scent and scratch marks
- Tufts on ears improve vocalization
- Can spot a mouse 250' away
- Can jump up to 10' into the air
- Runs upto 35 mi/hr (top speed 50 mi/hr)
- Lives between rocks, boulders, clefts in a dense forest areas
- Hunts prey in stealth and surprise attack (pounce), brings down prey 4x its size
- Can live up to 24 years in captivity
- Lynx mating only occurs in late winter

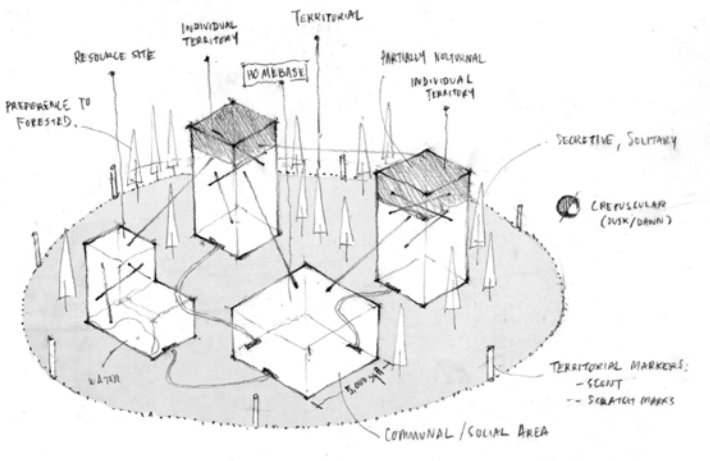
EURASIAN EAGLE-OWL

Mountain Ranges

Coniferous Forests

Steppes





FAST FACTS

Type: Mammal
Diet: Carnivore
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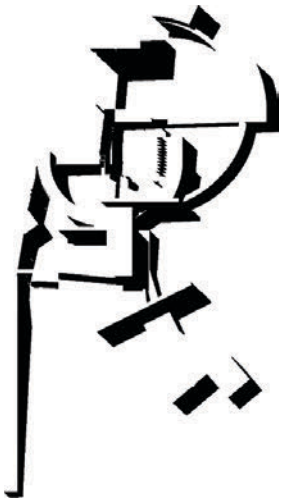
Size: Head and body, 36 to 63 in; Tail, 13 to 20 in
Weight: 40 to 175 lbs
Group name: Pack

Geography: Have the largest natural range of any land-based mammal besides humans
Habitats: Able to live in many biomes, from Arctic tundra to dense forests, to mountains, to dry shrublands.

UNIQUE CHARACTERISTICS

- Strictly nocturnal (sleeps during the day)
- Wings can span up to 6.5 feet
- Nest is located on a sheltered cliff ledge, in a cave or crevice
- Marks territory with sound, feces and prey feather markings
- Vision is stereoscopic (vision is 10x better than humans) with neck able to rotate 240
- Extremely sensitive ears
- Produce mournful 'ooo-hu' sound that carries for 3 miles within territory
- Hunting: often 'crash' through tree canopy to catch sleeping prey
- Hunting occurs from an open perch or in flight
- Can search rock crevices for roosting birds
- Preys can be as large as hares or young deer
- Can live up to 60 years in captivity
- Begins breeding from late winter



My design strategy is to visualise from the inside-out; allowing the scale of human and animal interaction to determine the overall design scheme. Hence, most design work begins and ends with an axonometric; in the form of a folly-like elements, dotting the landscape in field-like conditions with its playful, puzzle-like qualities.

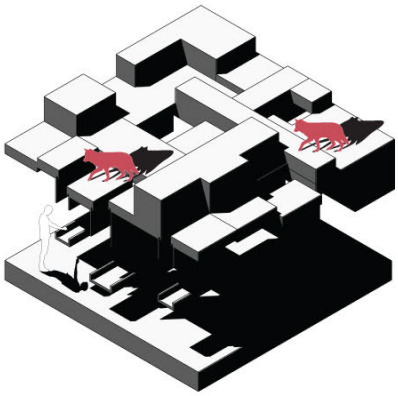
SCALE OF OPERATION

Interaction Scale -> Network Scale -> Masterplan Scale

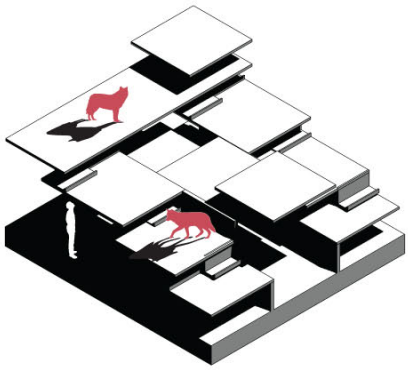
DESIGN PHASE

Visualizing the reimagined zoo

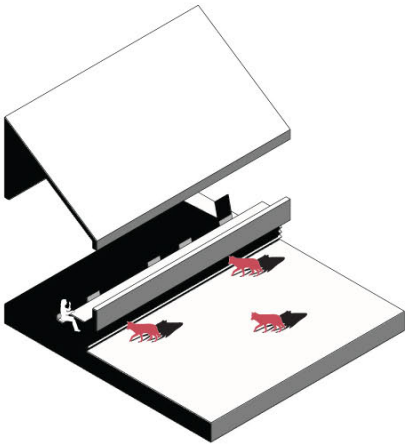
GRAY WOLF - passive enrichments



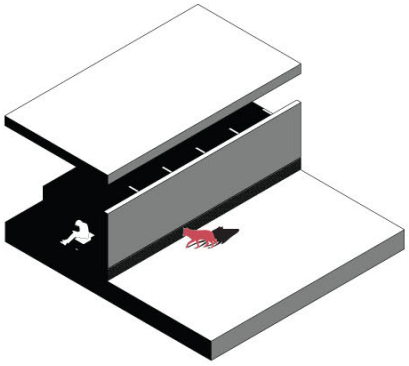
WOLF PUZZLE FEEDER VARIATION 01



WOLF PUZZLE FEEDER VARIATION 02

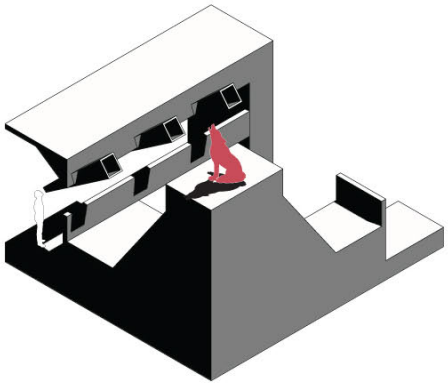


WOLF SCENT STIMULATION
restaurant variation

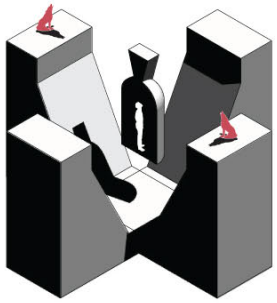


WOLF SCENT STIMULATION
restroom variation

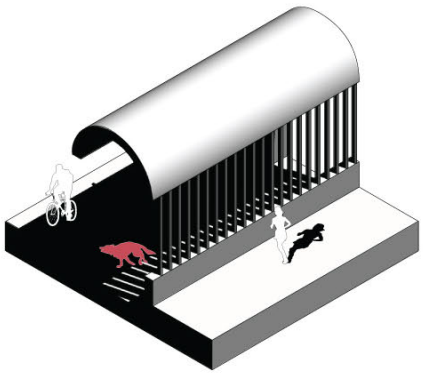
GRAY WOLF - active enrichments



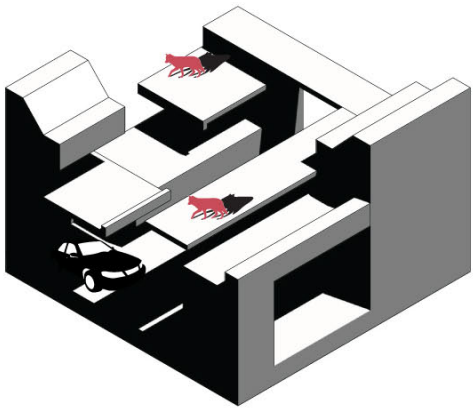
HOWLING IN UNISON VARIATION 01



HOWLING IN UNISON VARIATION 02

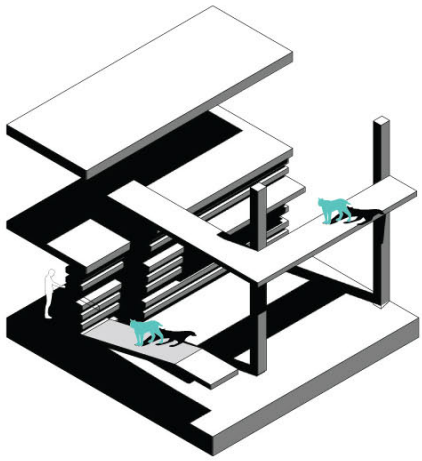


WOLF AGILITY STIMULATION

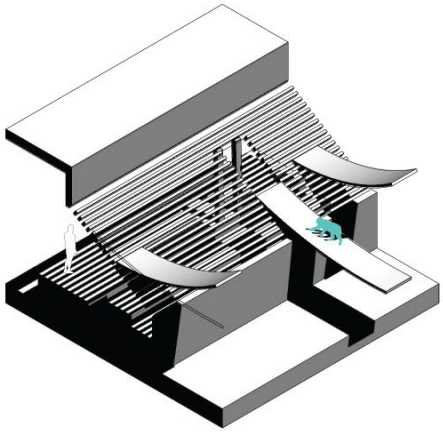


WOLF SECONDARY SOCIAL AREA
parking lot variation

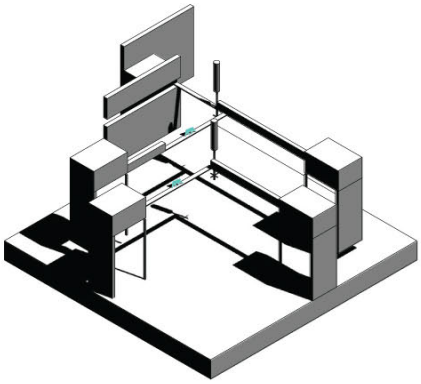
EURASIAN LYNX - passive enrichments



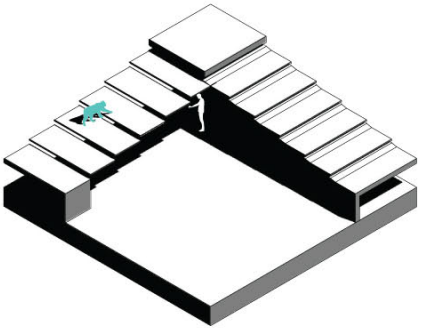
LYNX AGILITY ENRICHMENT VARIATION 02



LYNX AGILITY ENRICHMENT VARIATION 03

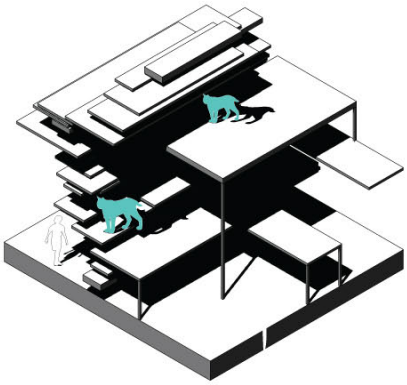


LYNX NOVELTY ENRICHMENT

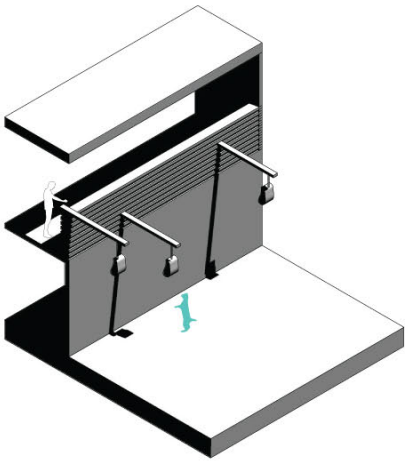


LYNX FELINE STIMULATION

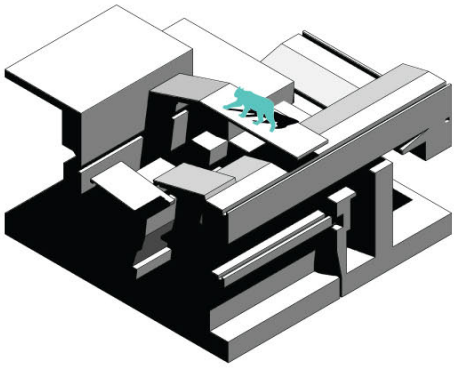
EURASIAN LYNX - active enrichments



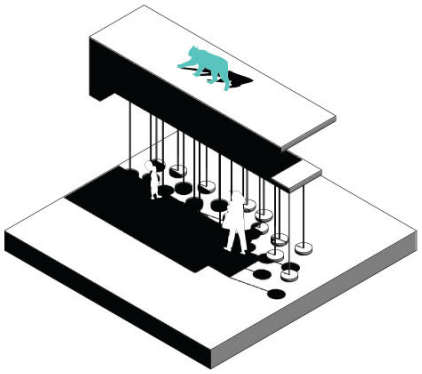
LYNX BLURRED BOUNDARY



LYNX AGILITY ENRICHMENT VARIATION 01

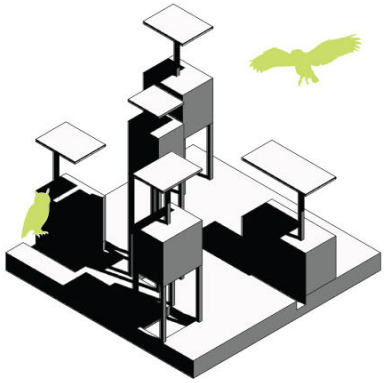


LYNX HEARING STIMULATION
variation 01

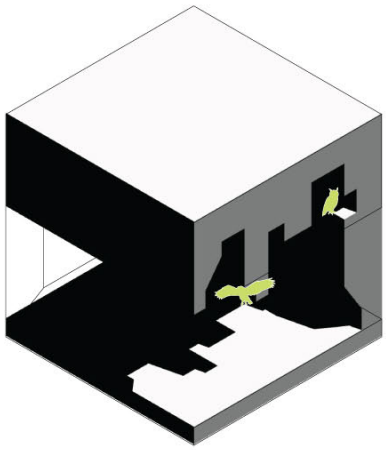


LYNX HEARING STIMULATION
variation 02

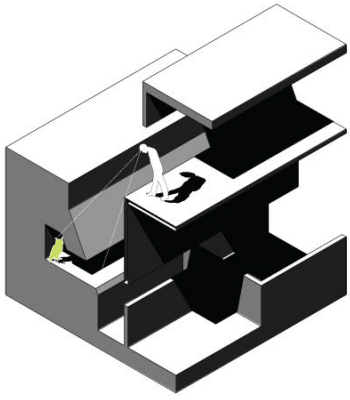
EAGLE-OWL - passive enrichments



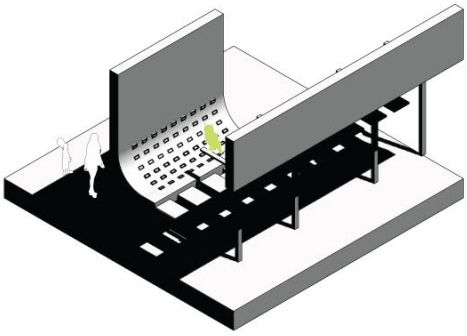
EAGLE-OWL PUZZLE FEEDER
variation 01



EAGLE-OWL PUZZLE FEEDER
variation 02

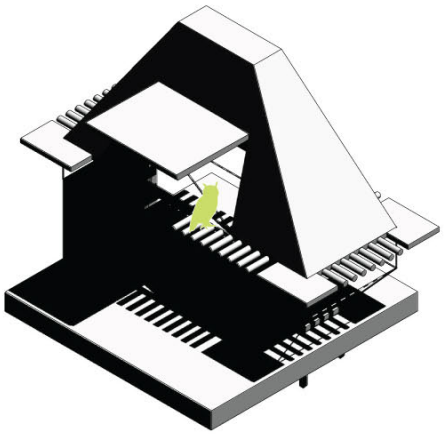


EAGLE-OWL CREVICE RETREAT

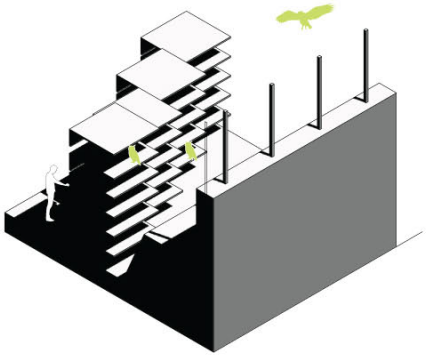


EAGLE-OWL 'UHU' AMPLIFICATION

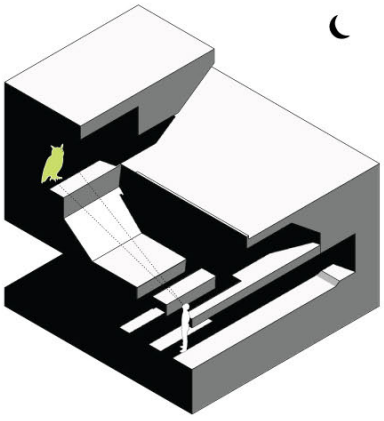
EAGLE-OWL - active enrichments



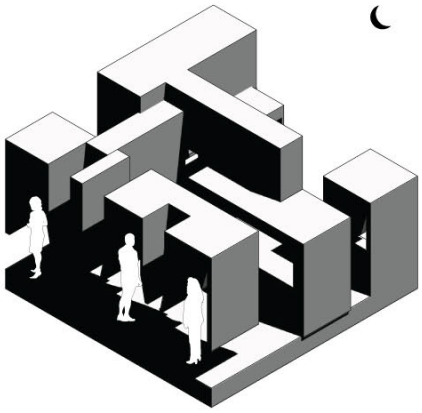
EAGLE-OWL 'HOUSE'



EAGLE-OWL INTERACTIVE PUZZLE FEEDER



EAGLE-OWL NIGHT VISION NICHE 01
Exclusive for night-time viewing

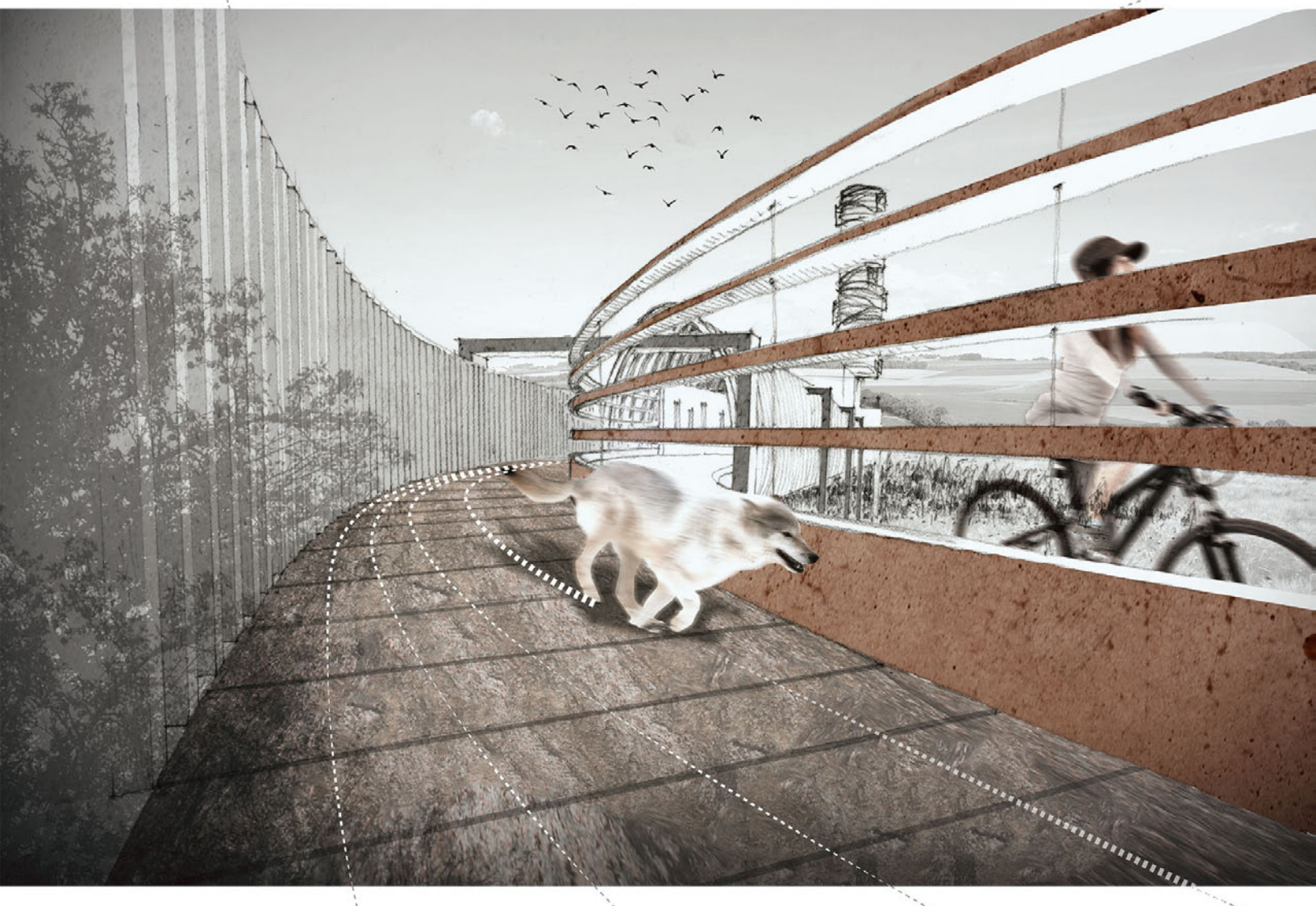


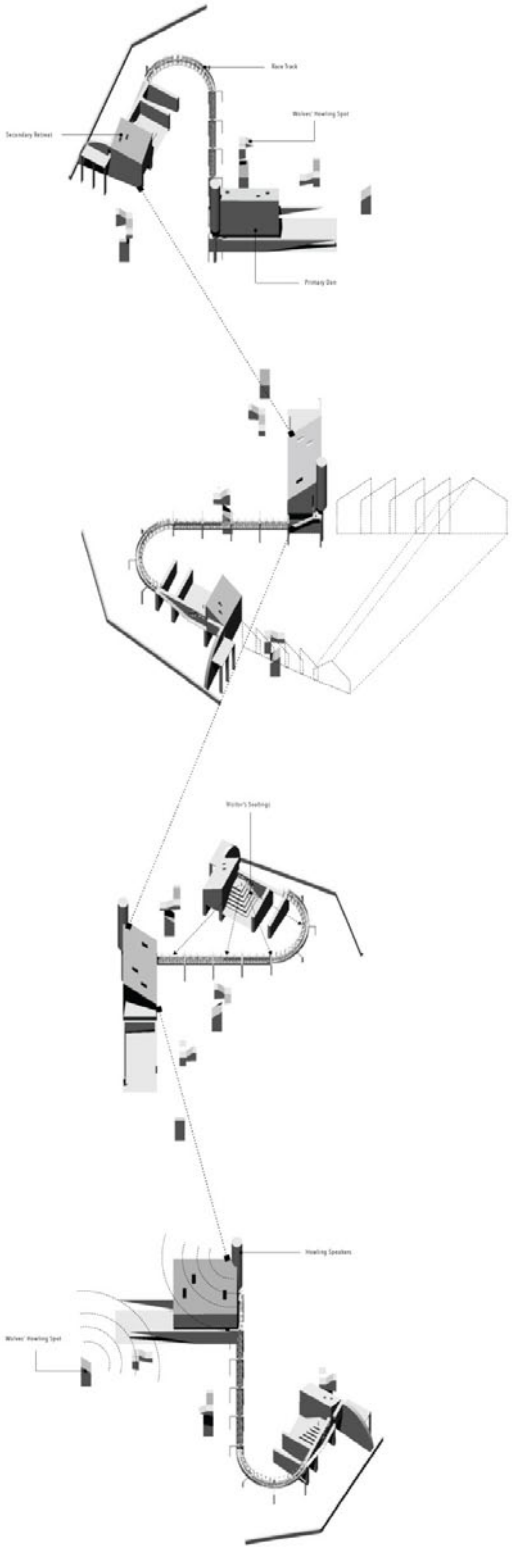
EAGLE-OWL NIGHT VISION NICHE 02
Exclusive for night-time viewing

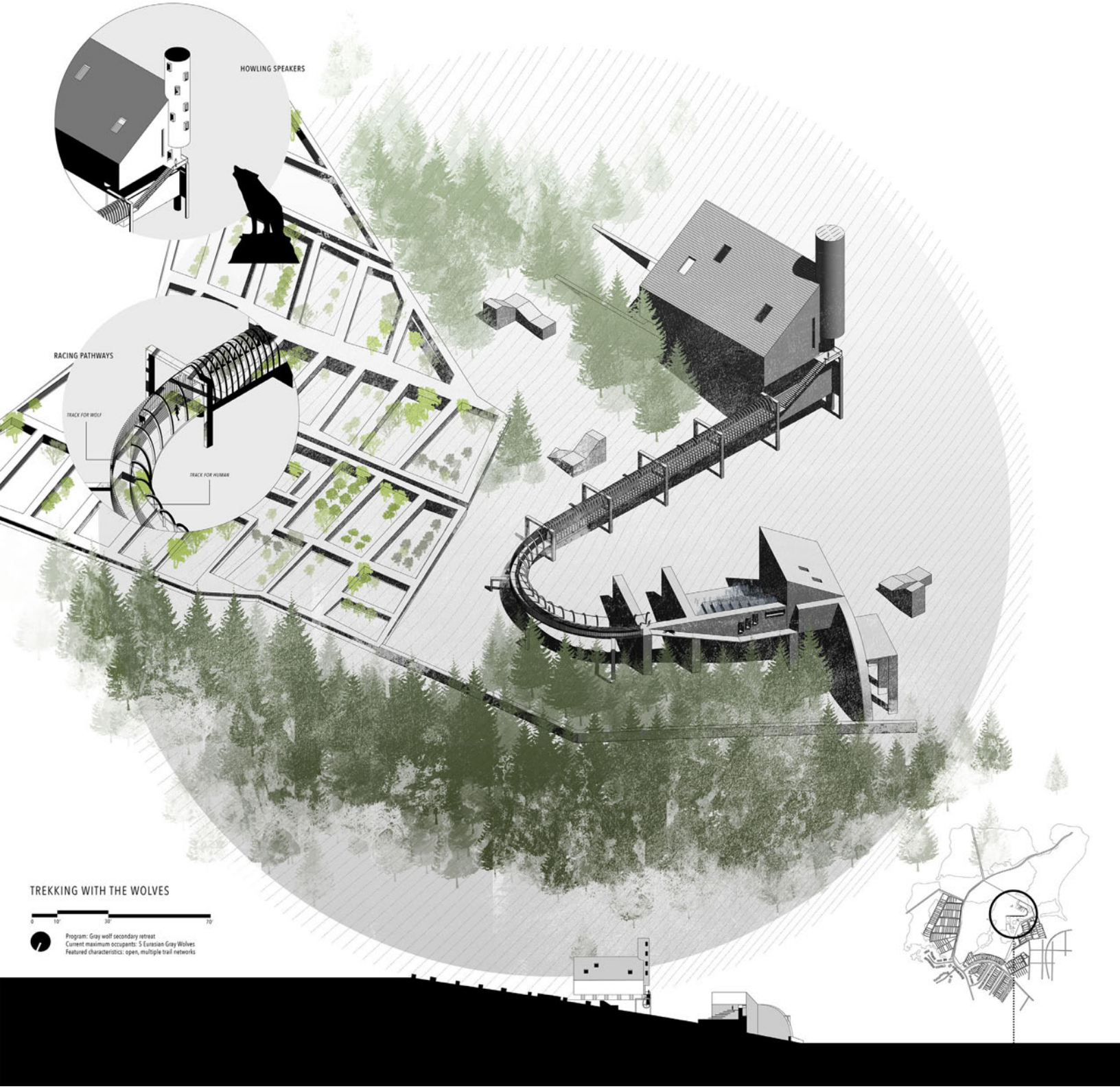
"Racing with the Wolves"

Wolves may not be the fastest runner, but they are one of the most agile and most travelled creature amongst the three species. Wolves spend up to 35% of the day travelling and can run up to 40 miles per hour during a vicious chase. Animals in zoos rarely get to exercise or perform agility training. This would explain why we visitors often see zoo animals sleeping or just sitting all the time. Over time they become inactive, thus triggering symptoms of Zoochosis.

This exhibit allows the visitors and the wolves to race each other across a track from one of the wolf's den to another. The human visitor is encouraged to race on a bike but they can look for a challenge by racing on foot. With a food as incentive in hand, the wolves will be more willing to participate as part of the training.



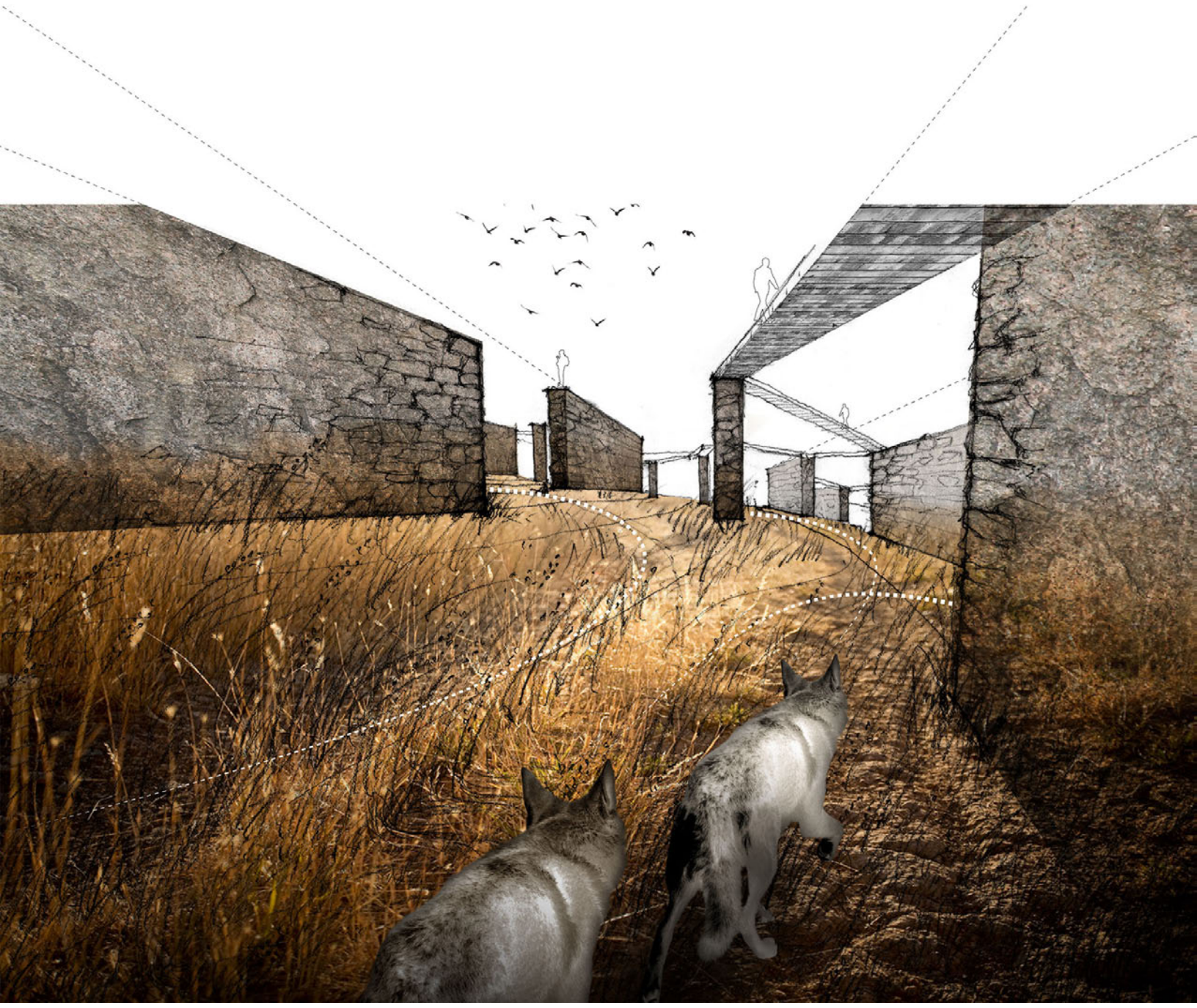

Race Track
Wolves' Howling Spot
Secondary Retreat
Primary Den
Howling Speakers
Wolves' Howling Spot

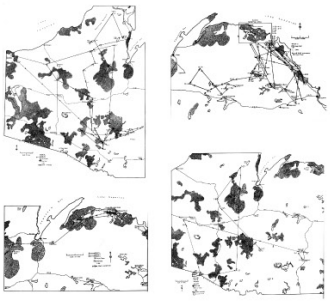

HOWLING SPEAKERS
RACING PATHWAYS
TRACK FOR WOLF
TRACK FOR HUMAN
TREKKING WITH THE WOLVES
0
10'
30'
70'
Program: Gray wolf secondary retreat
Current maximum occupants: 5 Eurasian Gray Wolves
Featured characteristics: open, multiple trail networks

"Trekking with the Wolves"

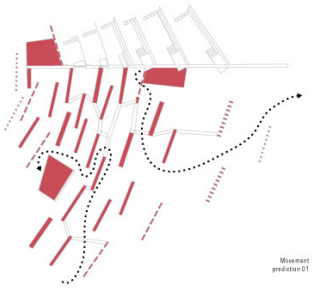
As mentioned earlier, wolves spend up to 35% of the day travelling between nodes of their territory; from their central core den to the resource sites or the social areas. From the research of Hediger's concept of territory, wolves also move along very specific network of trails and rarely venture off these paths.

The maze-like quality of this exhibit gives the visitors impression that wolves can move along any direction they prefer. With tall grasses growing amongs the field of half-walls, the wolves will leave behind a faint trail as the grasses are separated and trampled on. Over time, visitors may begin to see the paths that the wolves take via viewing pathways up above.



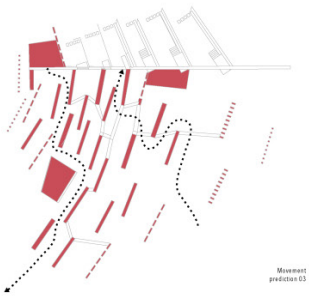


Movement of gray wolves between Northern parts of US and Canada

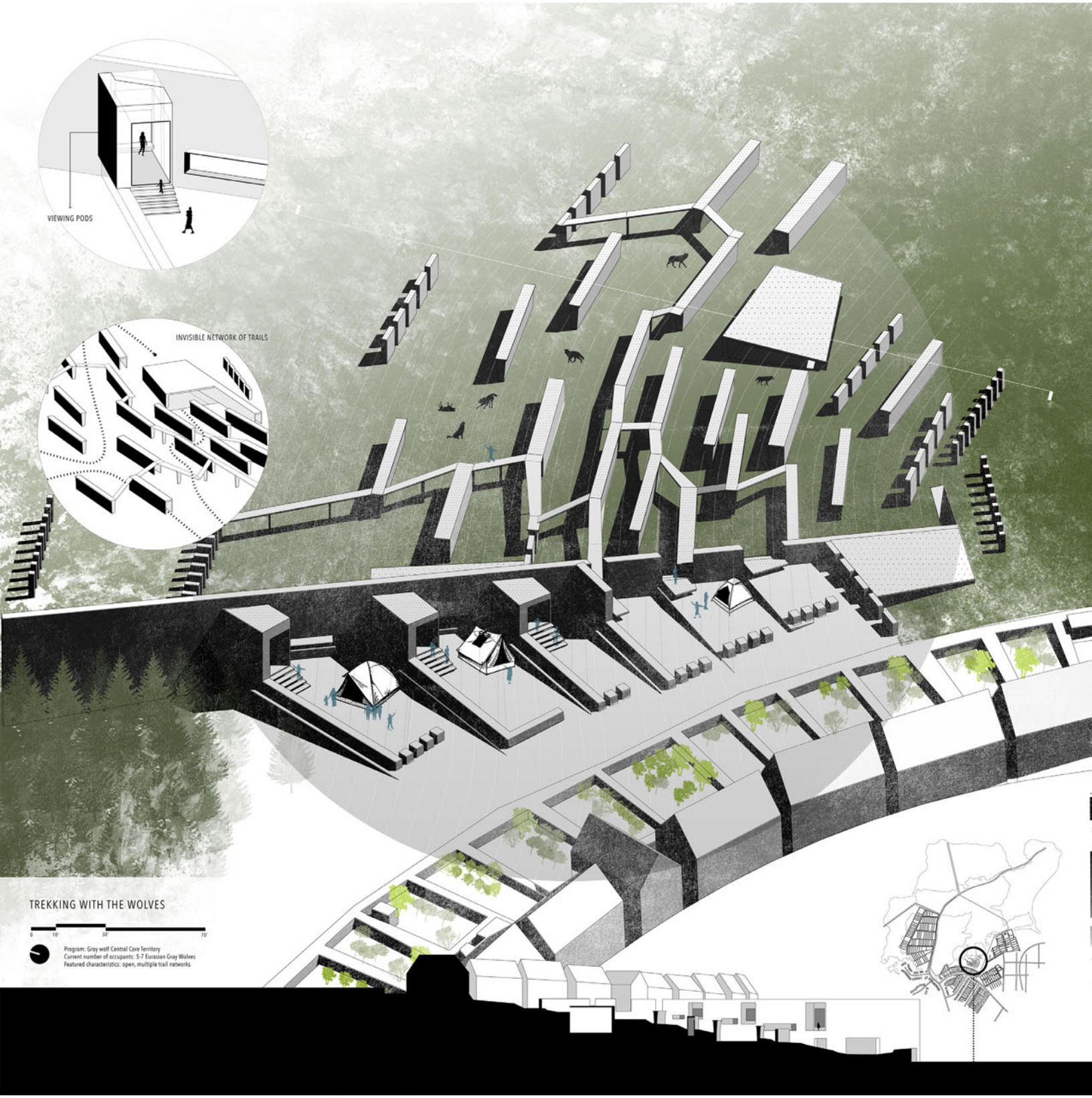


Movement prediction 01

Movement prediction 02



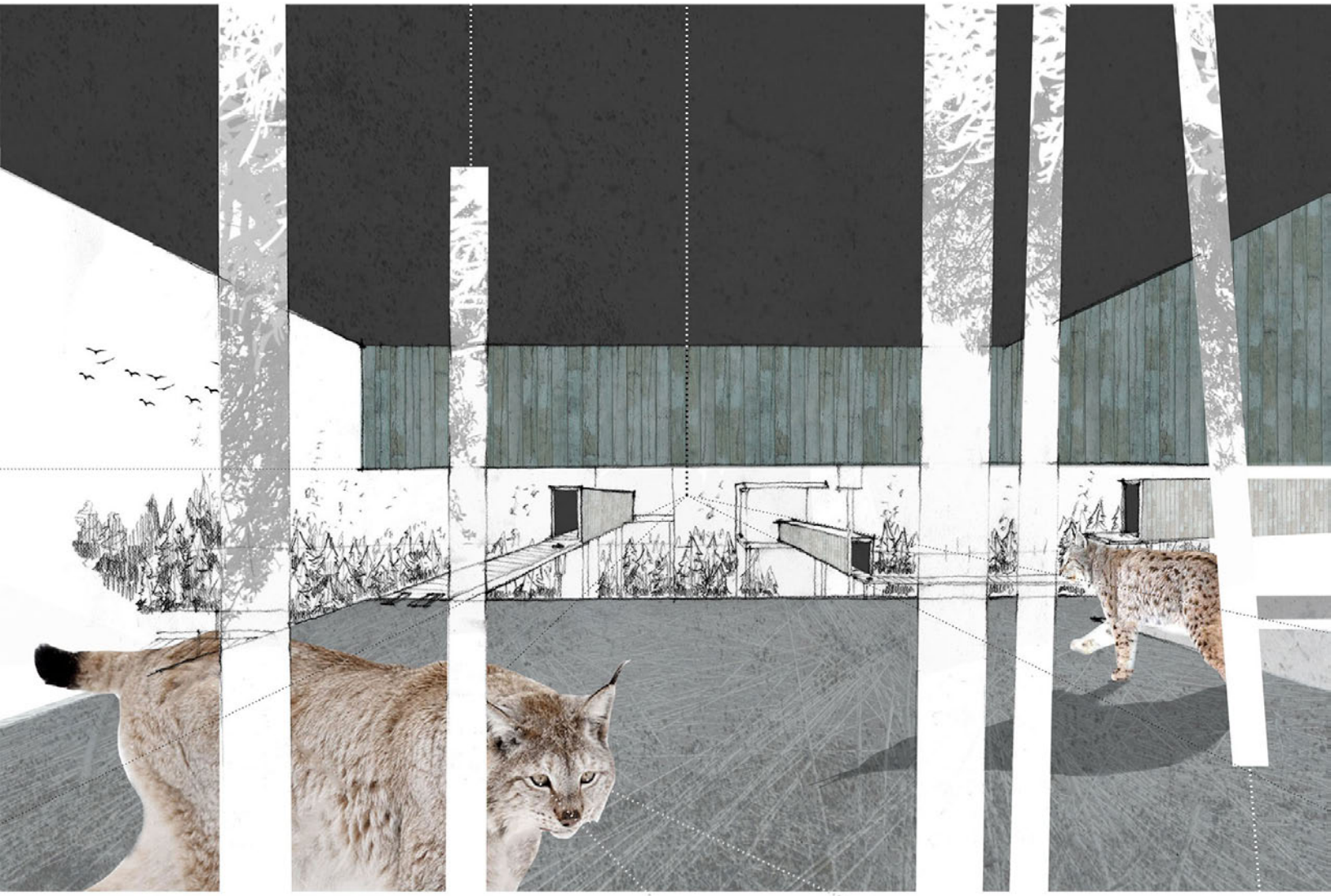
Movement prediction 03


VIEWING PODS
INVISIBLE NETWORK OF TRAILS
TREKKING WITH THE WOLVES
0
10'
30'
70'
Program: Gray wolf Central Core Territory
Current number of occupants: 5-7 Eurasian Gray Wolves
Featured characteristics: open, multiple trail networks

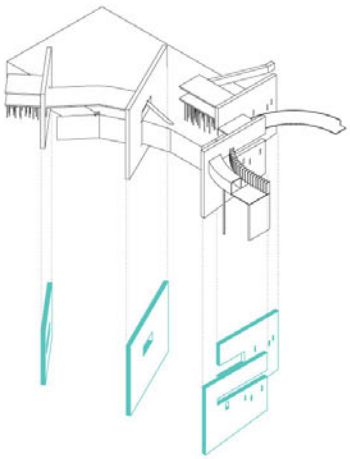
“Lynx Reconfigurable Retreat”

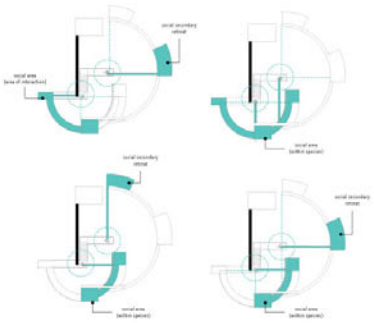
This retreat focuses on providing the lynx a sense of novelty. Pathways on which the lynx move on are reconfigurable by the human visitors from below via a “Reconfiguring Station”. Each week, the visitors are allow to turn the path in a different direction, allowing the lynx to explore “new” and unfamiliar territory on their own.

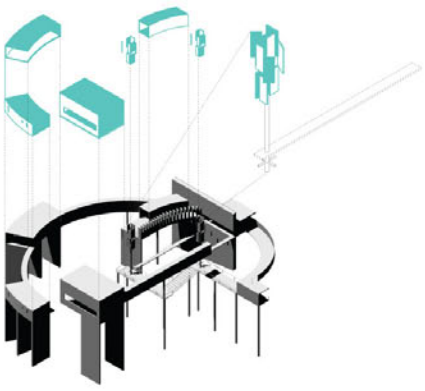
They also have a choice of moving to various dens that are scattered in this particular exhibit. All pathways are raised as lynx are avid climbers, particularly when they are young. Visitors will enjoy the experience of reconfiguring, interactive pathways while the lynx are enriched as their “home” is “new”, dynamic, and constantly in a state of change.

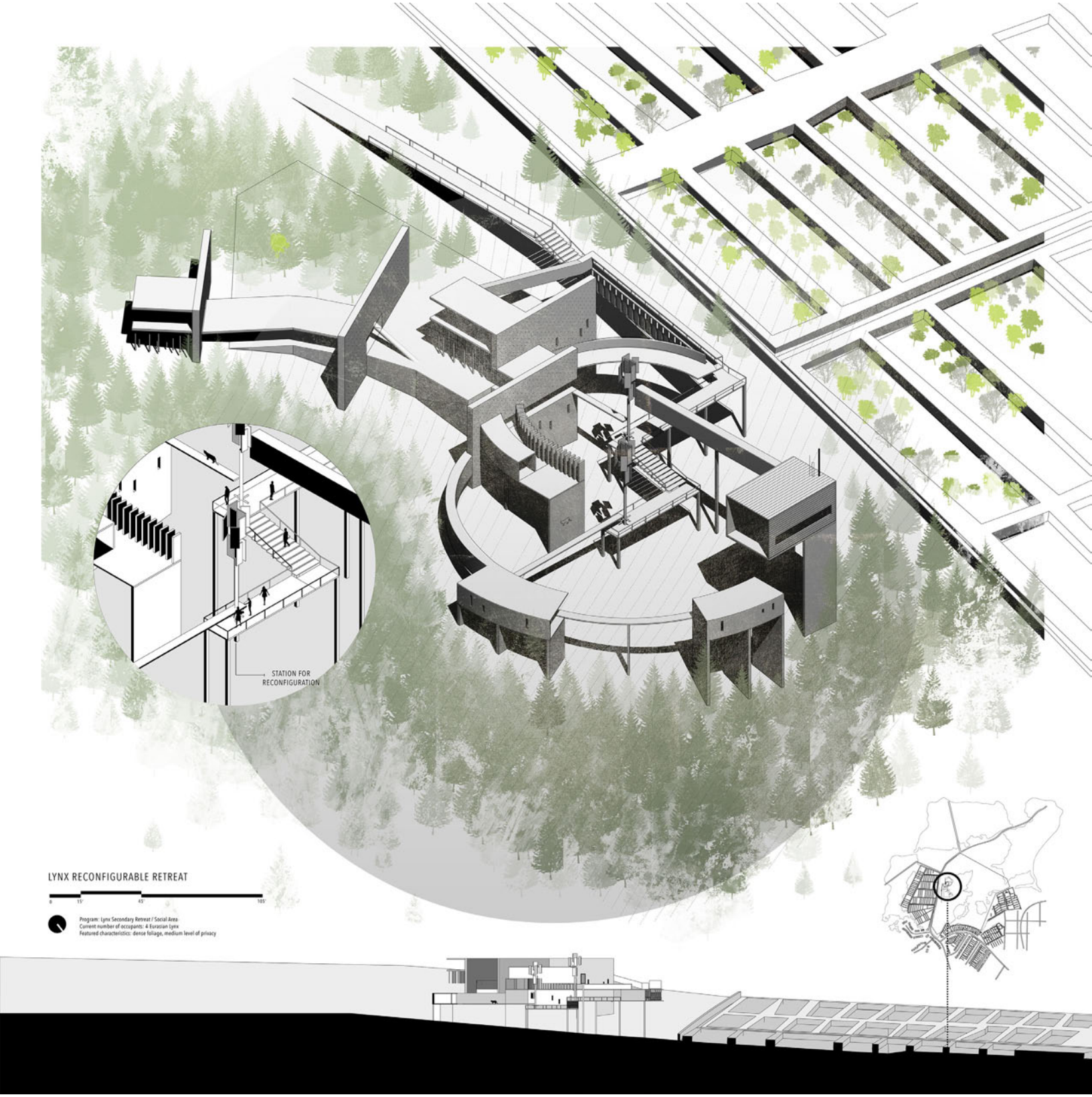


EURASIAN LYNX - active enrichments





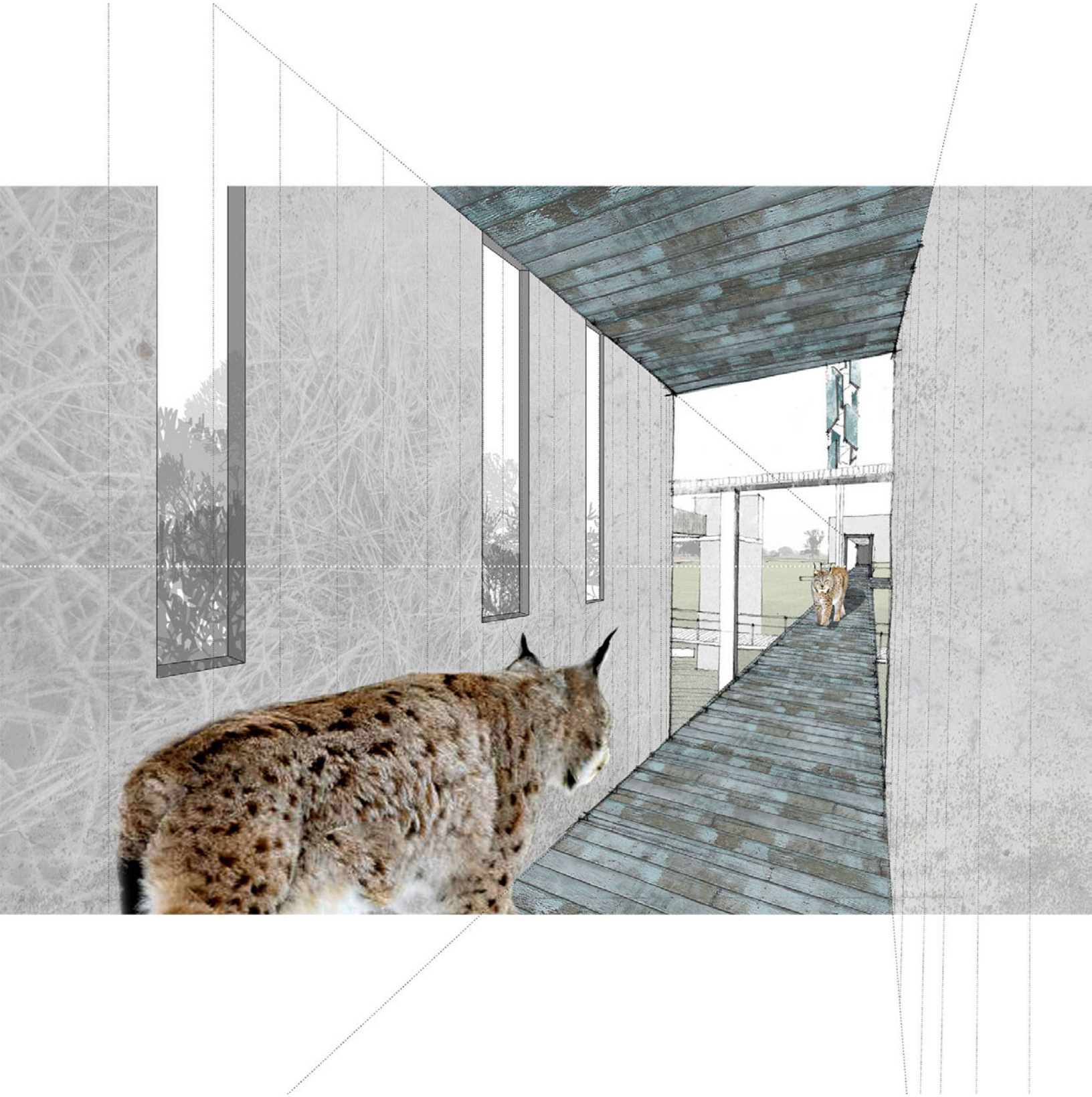


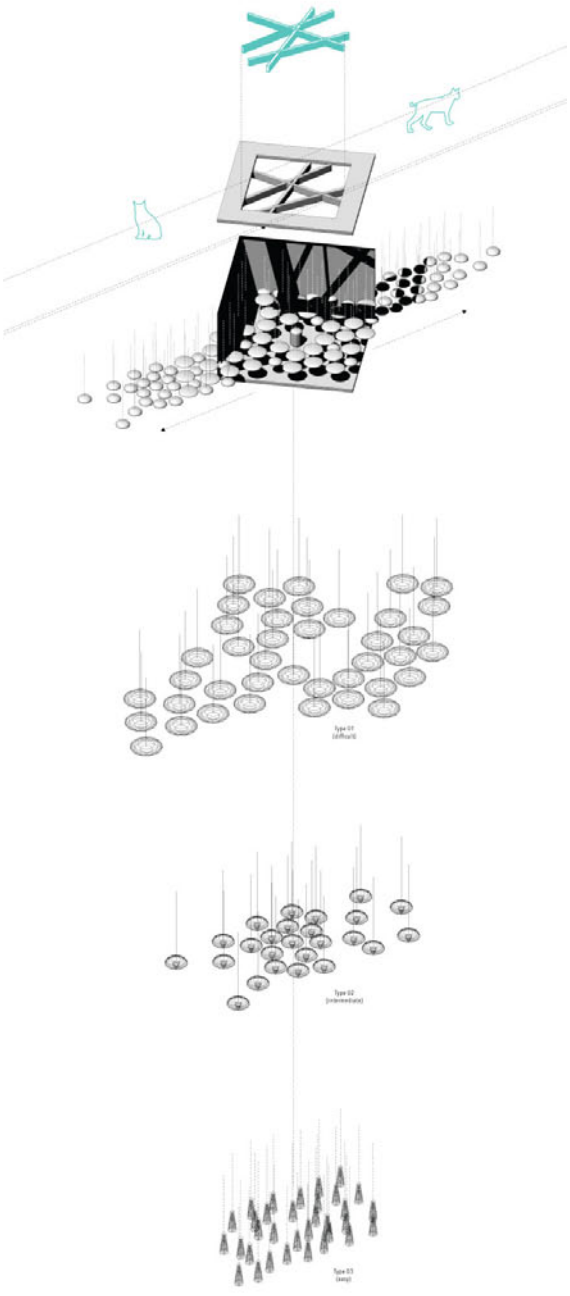

STATION FOR
RECONFIGURATION
LYNX RECONFIGURABLE RETREAT
0
15'
45'
105'
Program: Lynx Secondary Retreat / Social Area
Current number of occupants: 4 Eurasian Lynx
Featured characteristics: dense foliage, medium level of privacy

"Lynx's Whispering Corridor"

Lynx use their sense of hearing more than their sight to track down prey. They can hear a sound from over 250 feet away. This exhibit aims to stimulate the lynx's sense of hearing with a passive interaction with the visitors (visitors have only indirect engagement in the enrichment process).

Through this corridor, visitors are "challenged" to walk through curtains of hanging stone pieces as quietly as possible. A lynx walking above may begin to start detecting soft sounds of clanging stone pieces below, and may even start to "stalk" the sound as the visitors walk below.



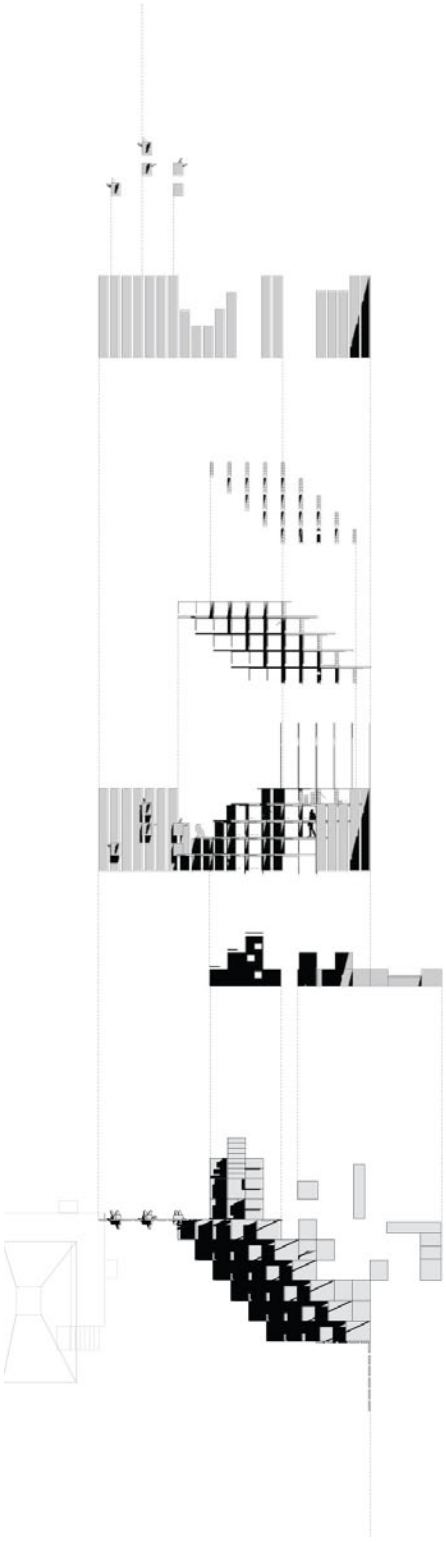


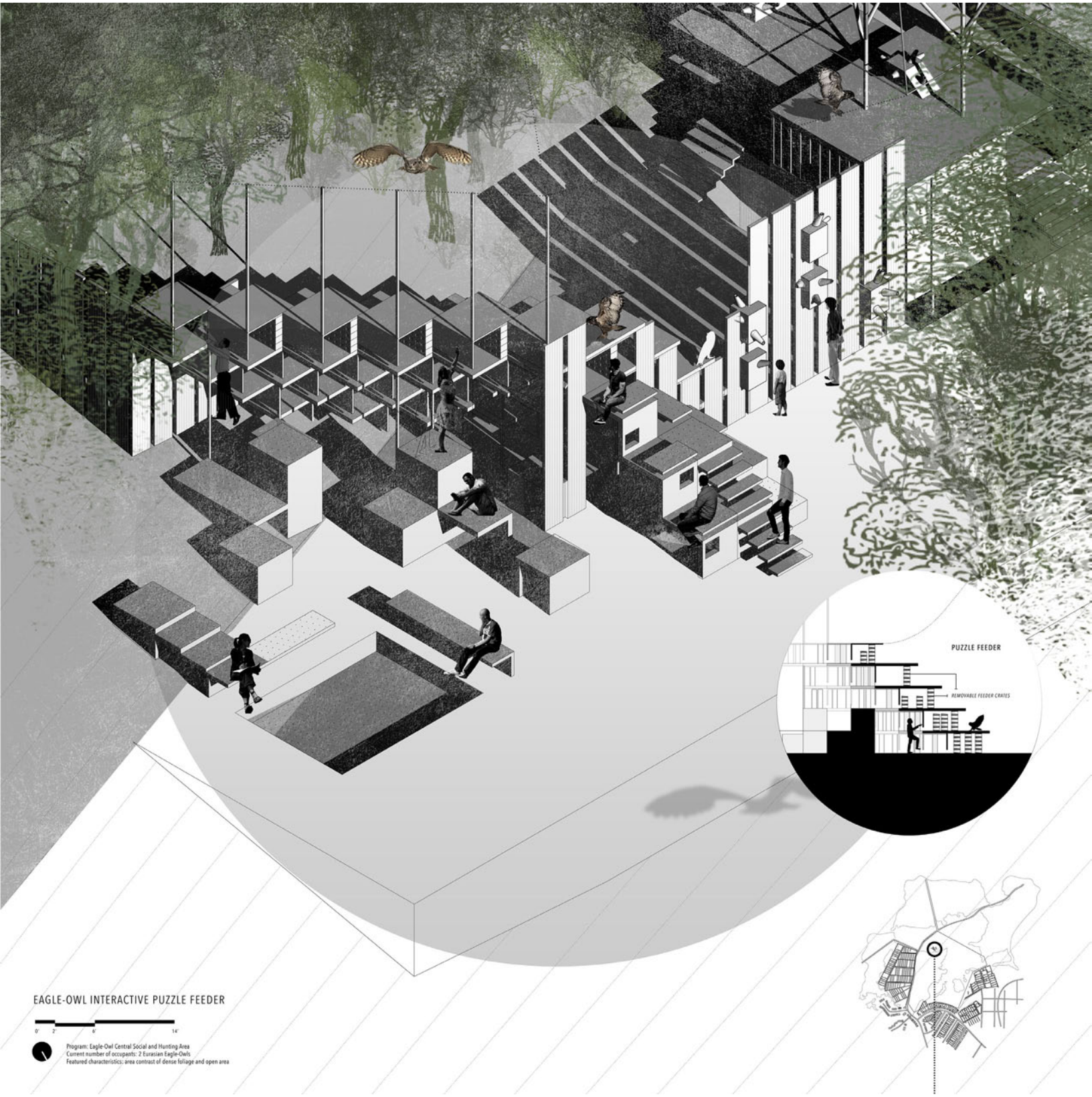

LYNX CORRIDOR OF WHISPERING STONES AND FOOTSTEPS
0
15'
45'
105'
Program: Lynx Passage Corridor (leading to central den)
Current number of occupants: 2-3 Eurasian Lynx
Featured characteristics: dense foliage, higher level of privacy

"Eagle-Owl Puzzle Feeder"

Puzzle feeders have been used commonly throughout a number of zoos today. However, they lack human interaction and most feeders are mere static objects. The puzzle feeders in this eagle-owl exhibit encourages the human visitors to place a number of food or scrap of items that the eagle-owls can choose from, into the egg crate-like panels.

From old newspaper to pieces of bread or meat, stuffed in the egg crates, the eagle-owl will also able to discover various objects in them. This encourage the owl's foraging behavior as they may be hunting or picking out scraps of food from the forest floor or amongst foliage. Food items or scraps of objects placed in egg crates will be checked and monitored by a zookeeper to ensure the owl's health and safety.





EAGLE-OWL INTERACTIVE PUZZLE FEEDER

0' 2' 6' 14'

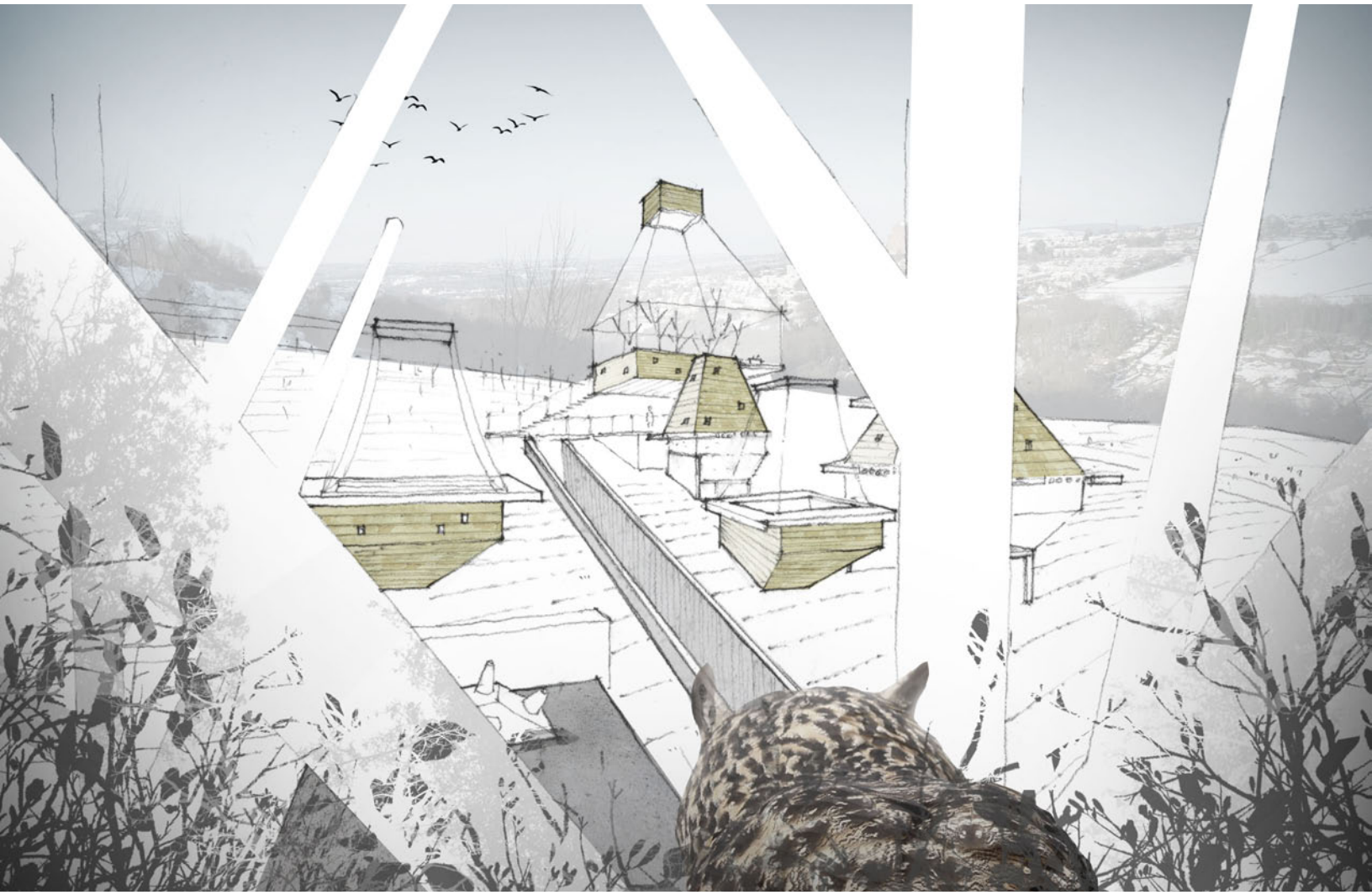
Program: Eagle-Owl Central Social and Hunting Area
Current number of occupants: 2 Eurasian Eagle-Owls
Featured characteristics: area contrast of dense foliage and open area

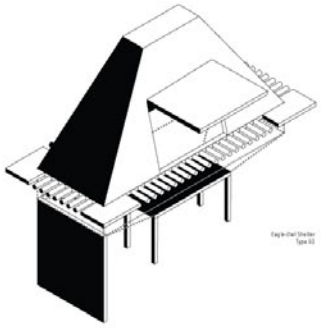
"Eagle-Owl Night Exhibit"

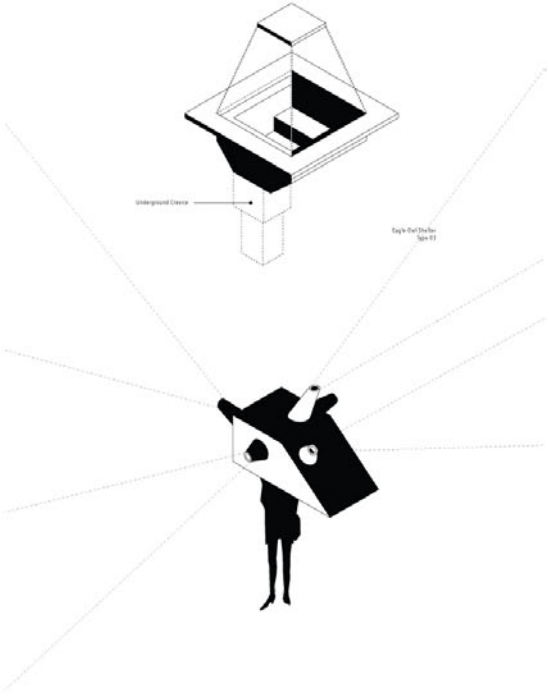
Eagle-owls are strictly nocturnal predators. They are most active at dusk and dawn, then sleep during the day. This exhibit is exclusive for the night time. Like most owls, eagle-owls have binocular vision as well as monocular visions. Monocular vision allows the eagle-owls to see almost up to 180 degrees in front of them (unlike humans with only 70 degrees of view).

"Night vision helmets" allow visitors to see into the night similar to the eagle-owls. Each cone of vision are aligned to a specific trees that eagle-owls may potential create their nests in. They maybe sitting there, or they may not. This is to counter the fact that zoos rarely offer animals a place to hide from the public gaze. The night time along with specific viewing angle will limit the freedom of viewing the owls and at least allows the owls to move to a different position, away from the visitor's stare.

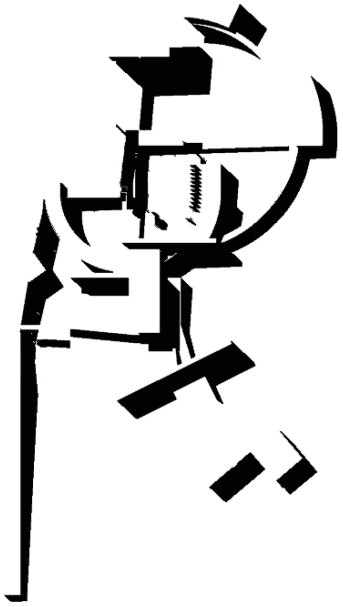
Additionally, eagle-owls are also territorial animals. They move along specific flight path as well as having various nodes of territory scatter across the landscape. These "owl houses" offer various programs from hunting area, to social area, to private retreat area. Some may also be underground as eagle-owls sometimes build their nests in crevices of rocks and cliffside.






Underground Crevice


NIGHT EXHIBIT WITH EAGLE-OWLS
0 5' 10' 15'
Program: Eagle-Owl Central Core Den (core territory)
Current maximum occupants: 3-4 Eurasian Eagle-Owls
Featured characteristics: area contrast of dense foliage and open area
VIEW THROUGH
NIGHT VISION NICHE
NIGHT VISION NICHE
(EXCLUSIVE TO NIGHT TIME VISITING)

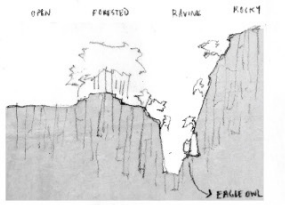


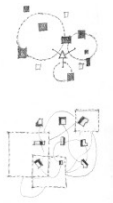
MASTERPLAN | *THE ZOOLOGICAL PARADOX*

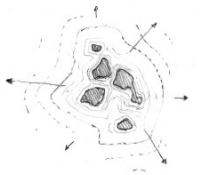
SITE: Sheffield, United Kingdom

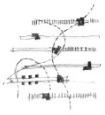
Surface Area: 766,370 sq ft (17.6 acres / 64 hectare)
Distance from Peak District National Park: ~3 miles (6 min drive)

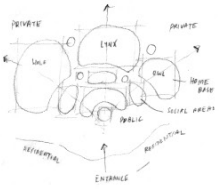
THOUGHT PROCESS

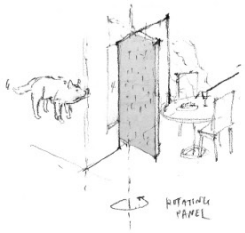


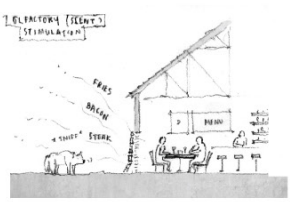


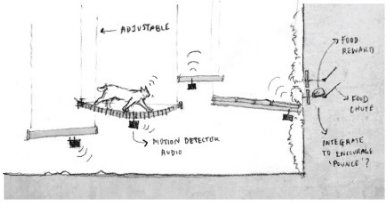


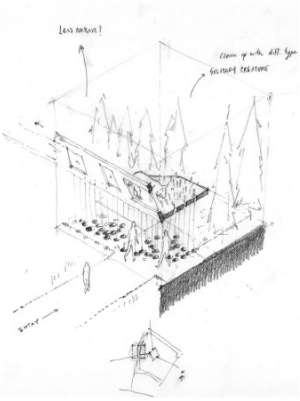


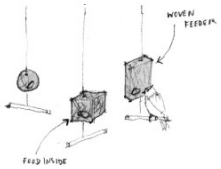


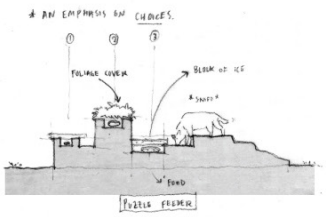


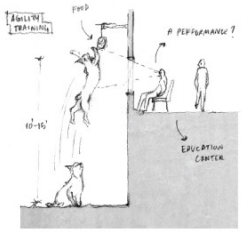


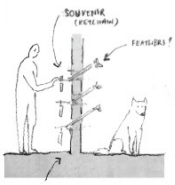


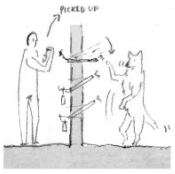


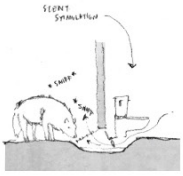


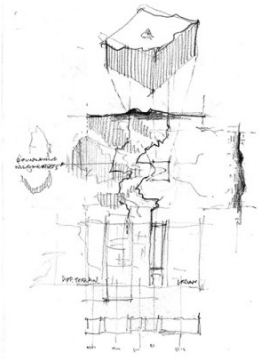


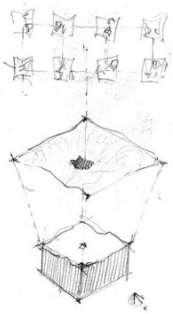


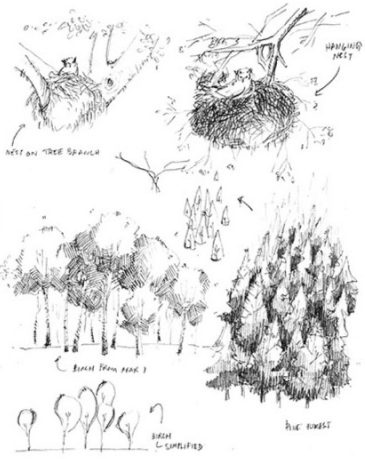


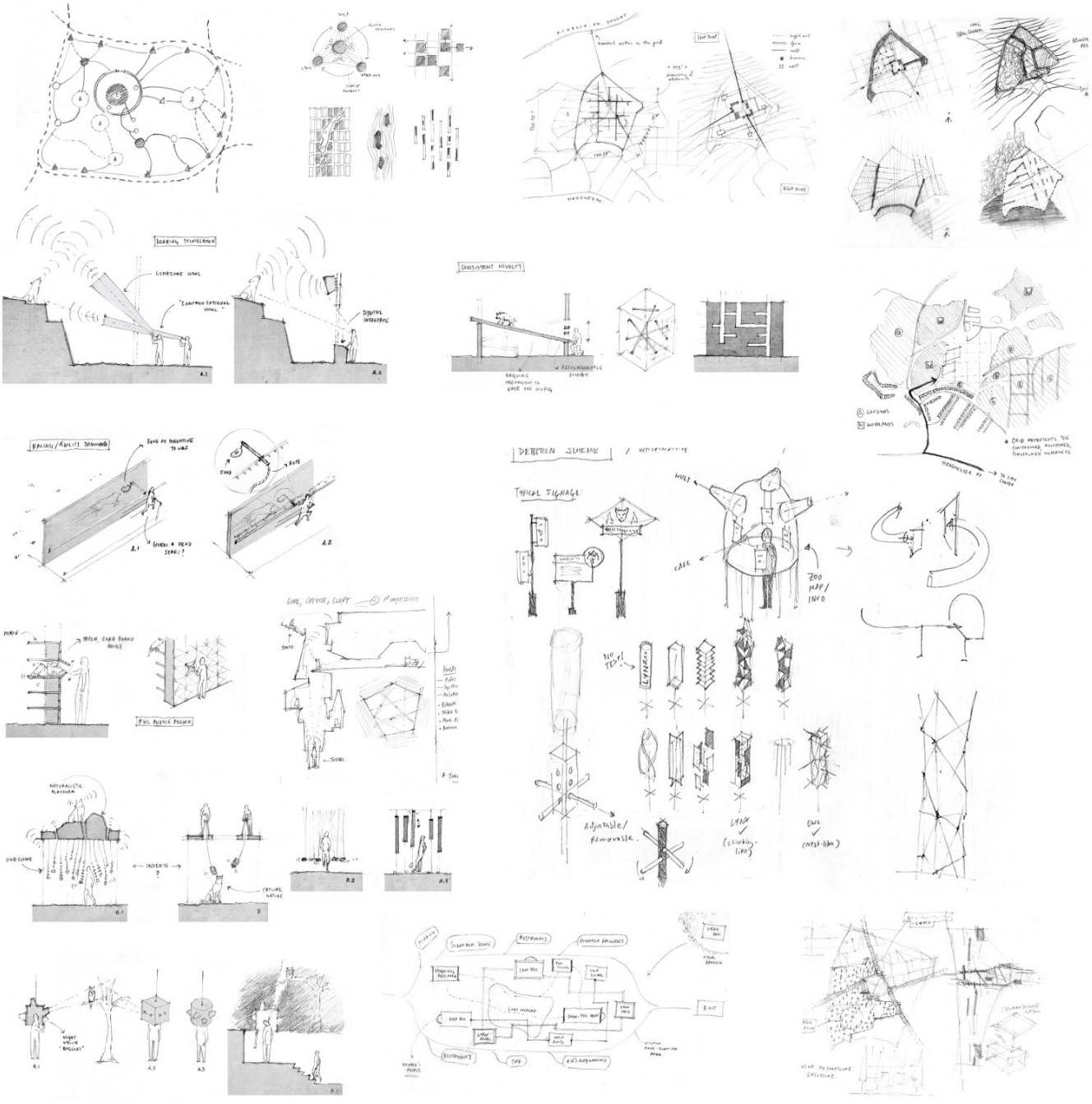











LONESOME HOWL
"CAMPMATE RATIONAL HOWL"
DIGITAL INTERFACE
DIRECTION SCHEME
TYPICAL SIGNAGE:
ZOO MAP/ INFO
CAFE
No Fear!
LYNX
Adjustable/ Removable
LYNX (climbing-like)
OWL (nest-like)
INVERSE
?
EXIT

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Barbara Bilgre - Marine Biologist / Environmental Science Instructor, Ghana

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B.arch Thesis Spring 2015

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